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THE LONG LEAF PINE

The American Forestry Association

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay $367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

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The Longleaf Pine

Identification and Characteristics

THE longleaf pine is one of the two most valuable timber pines in the eastern United States. The other is the white pine. The longleaf is found from the foothills of the Appalachian Mountains to the Coast from southeastern Virginia to central Florida, and thence westward in the Gulf States to eastern Texas. In this region it grows in a belt about 125 miles wide.

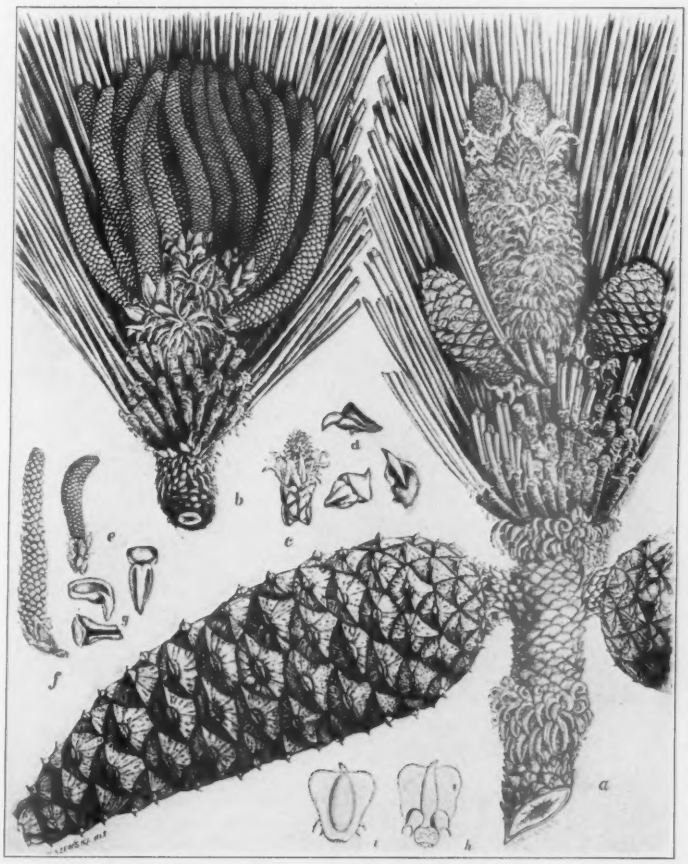
It has many names, fully twenty-eight, and chief among them are yellow pine and Georgia pine, but it is best and most generally known as Longleaf Pine.

It is a tall tree, reaching a height of one hundred to one hundred and twenty feet, and a diameter of two to three feet. Trees of this size have reached their full growth and are one hundred and seventy-five or more years old.

The stem of the longleaf pine is straight. It tapers but slightly. It is free from limbs for more than one-half way to its top. When it has reached its full growth it throws out large limbs, branched and crooked. These have dense tufts of long, dark green leaves at the ends.

The leaves are from nine to fifteen inches long. They grow in clusters of three and are enclosed at their base in a long sheath. They are so flexible that they hang down from the limbs gracefully and plumelike. The leaves are shed by the tree at the end of the second year.

Natives of the "pine barrens" where this tree grows sometimes weave the leaves into coarse fabrics for mats.



LONGLEAF PINE (*PINUS PALUSTRIS*) MALE AND FEMALE FLOWERS

A. Branch with mature cones and female flowers at top, just below which are young cones of one or two seasons' growth.
B. Cluster of male or pollen bearing flowers.
C. Detached female flower.
D. Detached young seed-bearing cone scales.
E-F. Detached male flowers.
G. Detached pollen sacks (anthers).
H-I. Detached very young female flowers showing two ovules at the base which later develop into seeds.

The cones appear on the tree when it is twenty or twenty-five years old. They are from six to nine inches long, slightly curved. They have thick, blunt scales with a sharp point or beak at the end. The seeds ripen in late summer but the cones open only in dry weather. If the weather is unfavorable they may not open until the middle of autumn.

The seeds when they fall on favorable ground frequently sprout before winter sets in. The seeds are devoured by squirrels and other seed-eating animals which like them very much.

The young trees grow slowly. They seldom are over seven inches high when seven years old, and being small and not strong are easily destroyed by forest fires or by cattle or other animals. Or, if the grass and weeds about them are high and strong the young longleaf pine trees

BARK OF LONGLEAF PINE

The bark is thin and orange-brown, separating on the surface into large papery scales which lie flat against the trunk.

have a hard and often unsuccessful struggle to live.

While it may be only seven inches high at seven years of age, its tap root may be all of seven feet long, and when the tree is full grown this tap root is often sixteen feet long. After reaching seven years of age, the tree grows rapidly until it is sixty or seventy years old, when the growth becomes slow again.

The bark of the tree is thin and orange brown, separating on the surface into large, papery scales which lie flat against the trunk.

The wood is heavy, exceedingly hard and strong. It is usually fine-grained and durable, orange color, sometimes of a very deep shade. It is largely used for building, both framing, flooring and interior finishing; also bridging, railway ties, fencing; and for masts and spars. Although it makes a hot fire, it burns slowly and warehouses and storage houses built of it are said to be of slow burning construction. It is rich in resinous materials and thousands of acres of trees are tapped annually for the "gum" (oleo-resin) from which resin and turpentine are derived. The older methods of obtaining the "gum" resulted in killing a great many of the trees in a very few years; recent improved modern methods are not so harmful. The wood, however, is not injured by this tapping.

Commercial Range

Alabama,	Mississippi,
Florida,	North Carolina,
Georgia,	South Carolina,
Louisiana,	Texas.

Unless protection against fire and means of reproduction are looked to, it is expected that there will be practically no longleaf pine trees left in a few years. They are being cut for lumber in large quantities every year, and without protection they are likely gradually to become extinct.

Commercial Uses of Longleaf Pine

By P. L. Buttrick

WHAT the white pine has been to the Northern States, the longleaf pine has been, and still is, to the Southern. If the great white pine forests of northern New England, New York, Pennsylvania, and the Lake States have vastly affected the lives of the people, not only within their borders, but in the nation as a whole, and have left it the poorer for their passing, the vast pineries of the South Atlantic and Gulf States have had no less an effect, and their passing is no less to be regretted.

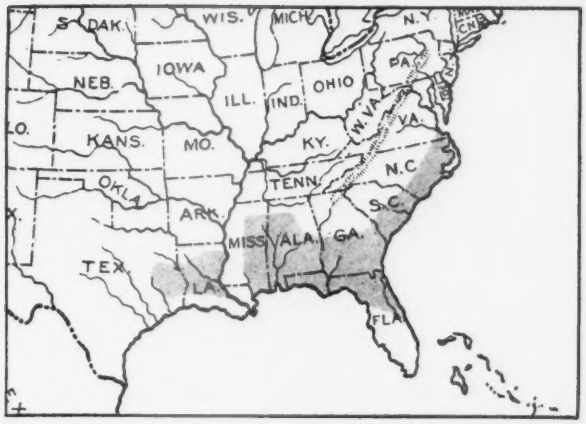
It is said that England won the title "Mistress of the Seas" with ships whose masts were of New England pine. These same ships tarred their rigging and calked their seams with tar and pitch derived from the longleaf pine of the South, for this tree was justly noted as a producer of naval stores before its wood was much used as lumber. Later the famous frigates of the American Navy which so boldly disputed England's title, were in part built of longleaf timbers. About all the original wood which remains today in the famous old frigate Constitution is its figurehead, which is of longleaf pine.

Although the longleaf is the pine tree par excellence of the South, there are other valuable pines in that section, and they are sometimes confused with it, chiefly because of the similarity of some of their common names, for all are called "Southern Pine" and all are called "Yellow Pine," but the trees are themselves quite distinct. Besides the longleaf pine, the other common southern pines are: the shortleaf pine, the loblolly pine, and the Cuban pine.

Properties of Longleaf Pine

Heavy, hard, very strong, tough;	Color, light brown or red;
Grain fine, even, straight;	Thin sapwood light yellow;
Compact;	Durable in contact with soil;
Annual rings narrow;	Height, 55 to 100 feet;
Proportion of heart wood large;	Diameter, 1½ to 3 feet.
Very resinous;	

The shortleaf is a tree of higher altitudes than the others, and



Courtesy Manual Arts Press.

MAP SHOWING COMMERCIAL RANGE OF LONGLEAF PINE

is not generally common in the longleaf territory. Its wood is highly valuable, but not so strong or resinous as the longleaf, yet sometimes the two woods so closely resemble each other that they cannot be distinguished even by an expert, so that they are sometimes marketed together. Loblolly is more important as a second growth tree than in the original forest and seldom occurs pure over large areas of virgin forest. Its wood is coarse grained, and weak as compared with the others. Most of the loblolly comes from the South Atlantic States, North Carolina being the leading producer. It is generally marketed as North Carolina Pine. The Cuban pine is, as its name indicates, a straggler from the West Indies. It occurs only along a narrow strip near the coast from South Carolina to Louisiana. Its lumber is valuable and more or less resembles longleaf, and is marketed along with it.

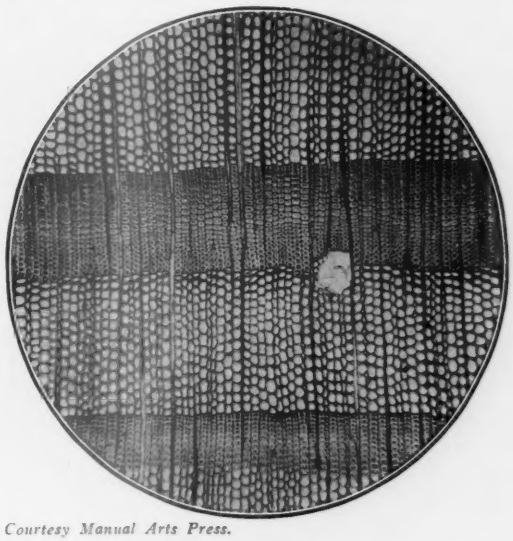
The longleaf itself occurs from the neighborhood of Norfolk, Virginia, south along the coastal plain, seldom more than 200 miles from the coast to Cape Canaveral and Tampa, and west along the Gulf Coast to Trinity River in eastern Texas.

NEEDLES 9 TO 15 INCHES IN LENGTH

Although the wood of longleaf may be at times difficult to distinguish from that of some of the other southern pines, the tree itself is absolutely characteristic, and once seen is always known. There are other pines with long leaves or needles, but this tree is *the* longleaf pine, and its needles are from 9 to 15 inches in length. The tree itself is tall and dignified in appearance. At maturity the crown is widespreading and flattopped, and does not descend very far down the trunk. It is composed of a few large irregular branches. While it lacks the symmetry of the white pine crown, it is by no means scraggly or fantastic. There is nothing "Japanesy" about the longleaf.

The tree attains large size, but it cannot rival white pine or hemlock, the two largest conifers of the Eastern states, in this respect. Trees 36 inches in diameter breast high and 120 feet tall are exceptional. A tree in Marion County, Mississippi, is 43 inches in diameter, but like most trees of the largest diameter is not of great height, probably not more than 80 feet.

Longleaf suffers from a super-abundance of common names. No less than twenty-seven are listed. Most of them are trade names, composed of various combinations of the words longleaf, or leaved, longstraw, yellow, hard, pitch, southern and the names of various states where the tree grows. The original trade name was North Carolina pine, which later became Georgia pine. In the export trade the wood is generally called pitch pine. Today it seems that the name of longleaf is being more used than ever before, and this is as it should be, for such an important and characteristic tree is entitled to a distinctive name. The technical name, *Pinus palustris* is unfortunate. *Palustris* is derived from the Latin *palus*, or *paluster*, which means swamp. Longleaf never grows in a swamp.



Courtesy Manual Arts Press.

MAGNIFIED CROSS-SECTION OF LONGLEAF PINE

This shows alternating bands of porus spring wood and dense summerwood, and spring and summerwood band together making one annual ring. Note resin duct near center of the cut.

Various Names

Longleaf pine,	Heart pine,
Southern pine,	Pitch pine,
Yellow pine,	Longleaf pitch pine,
Turpentine pine,	Long straw pine,
Rosemary pine,	North Carolina pitch pine,
Brown pine,	Georgia yellow pine,
Hard pine,	Georgia heart pine,
Georgia pine,	Florida yellow pine,
Fat pine,	Florida pine,
Southern yellow pine,	Florida longleaf pine.
Southern hard pine,	Texas yellow pine,
Southern heart pine,	Texas longleaf pine.
Southern pitch pine,	

IN A SOUTHERN PINE FOREST

There is a wide belt stretching from northern North Carolina along the coast to eastern Texas where the low-lying sandy soil is poor and sterile. It is a recently upraised sea bottom. Shallow streams wander through it edged by swampy bottoms. The upland is a flat or occasionally slightly rolling plain. At the coming of the white man, this great plain was covered with a pure and almost unbroken longleaf forest. A few scrubby oaks grew scattered here and there through it, and now and then a pine of other species, but that was all.

These hot, sterile, tree-covered flats were avoided by settlers of all but the poorest sort, and soon became known as the "pine barrens," whither fled the runaway negro slave and the renegade white, to eke out such existence as they might, and to take refuge in the swamps if pursued too closely. Yet these barrens are not without attractiveness. They are a distinct novelty, even to the tree-accustomed eye of the seasoned forester from other sections. Their flatness, openness and general lack of underbrush allow one to see long distances through the trees. Vistas of a mile or more straight through the timber are not impossible. Orginally, it is said, there was some undergrowth beneath these forests, but today, after repeated fires, they are generally carpeted only with thin grass and a few pine needles. One can travel through them with as much ease as over a prairie.

It is delightful to ride horseback through them, or, if one wishes, in a buggy, for it is possible to drive almost anywhere. And then there is the sunlight. One begins to understand the meaning of that phrase, "the Sunny South," after a brilliant day spent in the company of the virgin longleaf forest. The misty shadowless light of early morning is followed by the brilliant morning and noonday sun, which comes straight down through the tree tops, casting light and fleeting shadows. Then comes the golden light and the long flat shadows of late afternoon—the evening of the South. They show the great pines with their regular brown trunks in all possible combinations of light and shade. Nor must we forget the fragrance—that rich piney smell, so much richer than from other pine forests.

Courtesy of Southern Pine Association.

THE SENTINEL

A lone tall longleaf pine left by the owners of the land to re-seed the cut-over area surrounding it.

HEALTH AMONG THE PINES

Despite their intense summer heat, if one will but observe a few rules of sanitation required by the proximity of the tropics, the pine barrens are a health resort. Witness the fame of Southern Pines, North Carolina; Sumter, South Carolina, and many places in the interior of Florida, to say nothing of the "Ozone Belt" in Louisiana and Mississippi. After an experience in the sunlit barrens, one can cheerfully drink the old toast to the oldest of the longleaf pine states:

"Here's to the land of the longleaf pine
The summer land, where the sun doth shine
Where the weak grow strong and the strong grow great,
Here's to the Old North State!"

The English speaking settlers came into contact with longleaf at the settlement of Jamestown, and as early as 1610 tar, pitch and turpentine, the triumvirate of products of the pine tree which are known as naval stores, are mentioned as possible products of the new Colony, although no shipments seem to have been made at that time.

EARLY SHIPMENTS TO ENGLAND

It was not until about 1660, when the first settlers pushed south from Virginia and settled along the north shore of Albemarle Sound in what is now North Carolina, that the colonists came in contact with the vast forests of the pine barrens. Their first exploitation took place shortly afterwards, and by 1704 shipments of pine tar from the Carolinas to England amounted to over 400 barrels per annum. Shortly after that the exhaustion of the supply of naval stores obtained from the pitch pine forests in New England gave the industry an added impetus.

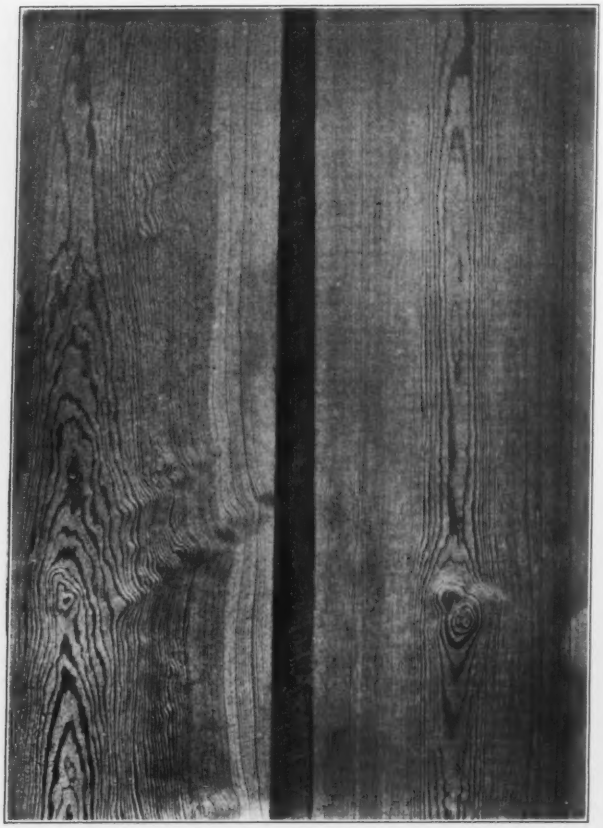
It seems to have been about 1750 that the production of turpentine and resin as well as tar and pitch was undertaken. From the middle of the eighteenth century till the early part of the last quarter of the nineteenth,

Courtesy The American Lumberman.

TYPICAL LONGLEAF PINE STAND

The trees reach a height of one hundred to one hundred and twenty feet and a diameter of from two to three feet. The larger ones in this picture have reached their full growth and are doubtless one hundred and seventy-five years or more old. The stem of the longleaf is straight and free from branches for more than half way to the top.

North Carolina led the world as a producer of naval stores. The close connection between the North Carolineans and this industry was the probable cause of their receiving the well-known appellation of "Tarheels." Up to 1820 most of the turpentine and resin was used in this country—only tar and pitch being extensively exported. But a few years later the increased use of turpentine as an illuminant and in the arts caused a greater demand. Soon the North Carolina forests could no longer supply the demand, and other virgin pineries were sought. In 1850 the industry entered Georgia which in 1880 became the leading state in production, and in a few years later Savannah became the leading naval stores center of the world, which position it still holds. Between 1900 and 1910, Georgia lost first place to Florida. Alabama, Mississippi and Louisiana are now important producers, but the virgin pineries of western Louisiana and eastern Texas have not yet been extensively invaded. Bruns-



Courtesy The Southern Pine Association.

LONGLEAF PINE BOARDS

Immense quantities of Longleaf pine are made into flooring, and manufacturers of window and door frames and of sash and doors draw supplies of raw material liberally from this source. It finds place as finish for kitchens, halls, libraries and sleeping apartments and is made into stairs, railing, molding, spindles, balusters and newel posts and also for the manufacture of furniture, cabinets and wardrobes.

wick, Jacksonville, Pensacola, Mobile, Gulfport and New Orleans, all figure as trade and export centers.

According to the 12th and 13th Censuses, the value of the naval stores produced in the different States in round numbers was as follows:

	1910	1900
Florida	$12,000,000	$6,500,000
Georgia	8,000,000	8,000,000
Alabama	2,500,000	2,000,000
Mississippi	1,500,000	1,500,000
Louisiana	1,250,000	1,000,000
North Carolina	750,000	1,000,000
South Carolina	250,000	750,000
Texas	200,000	

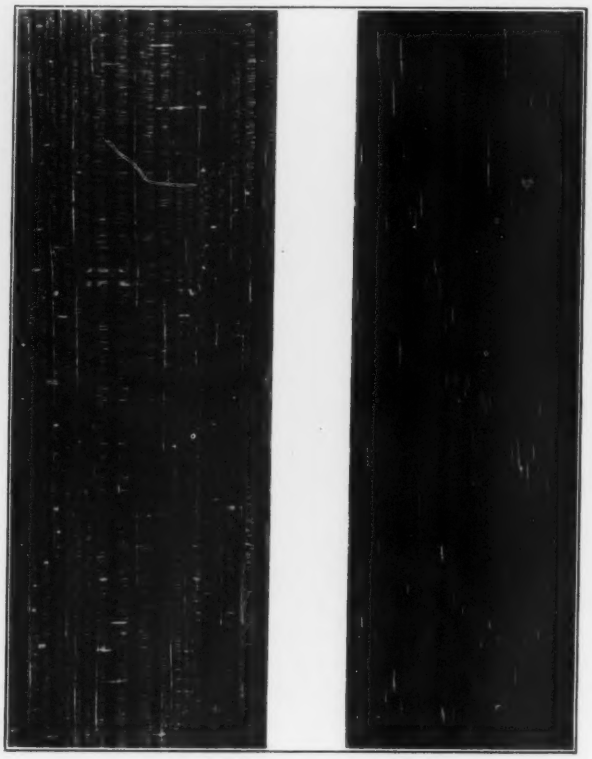
The value of the naval stores production for a series of years as taken from the Census reports is as follows:

1849	$ 2,855,657
1859	6,468,369
1869	3,585,369
1879	5,585,369
1889	8,077,379
1899	20,344,888
1909	25,295,017

In 1909 the total production was 289,888,954 gallons of turpentine, valued at $12,654,288, and 3,263,857 barrels of resin valued at $12,576,721. About 50 per cent of the crop was exported. The amount of naval stores produced from other American trees is insignificant.

WOOD TAR AS A BY-PRODUCT

Wood tar is produced from pine wood. The original process was very primitive. Dry wood, often roots, stumps and logging waste was piled in a pit which had an underground opening. The pile was covered and fired in the same manner as a charcoal pit, and as combustion proceeded the tar flowed into the underground opening and was collected in barrels. Pitch is obtained by boiling down or burning wood tar. With the passing of wooden ships and sailing vessels, the demand for tar and pitch has fallen off. Today most of the pine tar is used by destructive distillation in iron kilns.



Courtesy of the Manual Arts Press.

LONGLEAF PINE BOARDS

Board on left is quarter sawed, sawing having been done at right angles to the annual rings. Board on right is bastard or tangential cut, sawing having been done parallel with or tangential to annual rings.

The collection of the crude resin, which is the raw product from which resin and turpentine are made, was originally carried on by digging holes in the ground at the base of the trees and then gashing the trunks so that the resin would flow from the wound into the hole. This crude and wasteful method gave way to the system known as "boxing," in which a hollow or "box" is cut in the tree at its base and into which the resin flows from the cut face above. This system, too, is wasteful, both

Courtesy of the Southern Pine Association.

LONGLEAF PINE TREES TAPPED FOR THEIR "GUM"

Thousands of acres of these trees are tapped in this manner each year for their "gum," (Oleo-resin) from which resin and turpentine are derived. The old methods of tapping resulted in killing a great many trees in a few years but the modern and improved methods are not so harmful. Formerly the "gum" was collected in holes or boxes out of the base of the trees. Now cup systems are used, the one invented by Prof. Herty a few years ago being considered among the best. Turpentine stills are scattered all over the yellow pine belt. The "gum" gathered from the trees is placed in these stills and heated. The lighter portion comes to the top and passes off as vapor, which when condensed becomes the turpentine of commerce. The heavier portion is drawn off from the bottom. It becomes resin.

of resin and timber, and many cup devices were tried, so as to do away with the box, but it was until about fifteen years ago that Professor Charles Herty perfected the cup and gutter system which bears his name. Other cup systems have come in since, and today the old wasteful "boxing" system is rapidly being abandoned.

Crude resin is collected in barrels, hauled to the turpentine stills and distilled. The turpentine being the lighter product comes off first and is collected in barrels. The heavier resin remains in the still and is drawn off at its base. In the early days turpentine was the most valuable product, but now resin is more in demand.

Today the title of "naval stores" is rather a misnomer, since their use is now so largely in the arts and industries rather than in shipping. Turpentine and resin enter into the manufacture of paints, varnishes, papers, soap, lubricants, rubber goods and in the pharmaceutical industries. Turpentine sells for about 42½ cents per gallon wholesale, while resin of the best grade is worth about $7.50 per barrel, and pine tar 8½ cents per gallon.

THE TURPENTINER AND HIS METHODS

The turpentiner is almost a nomad. It takes only five years to exhaust an "orchard," which means that he must move almost that often. So he moves his still, his house, his store and all his other possessions and starts anew. He generally has his own crew of negroes who follow him from place to place, and depend upon him for employment, supplies, counsel and protection. Some of the turpentine men have in their employ negroes whose fathers and grandfathers were the slaves of their fathers and grandfathers. Without the negro, it would be difficult to carry on the naval stores industry. Life in the turpentine camps is often even rougher and more primitive than in the old time logging camp, yet some of the turpentine operators carry on their establishment in the spirit of the Old South.

LONGLEAF PINE LUMBERING

Longleaf lumber was first used locally in the region of its occurrence. In the sections of the South where

Courtesy Southern Pine Association.
BOX SHOOKS MADE FROM THE TRIMMINGS OF LONGLEAF PINE

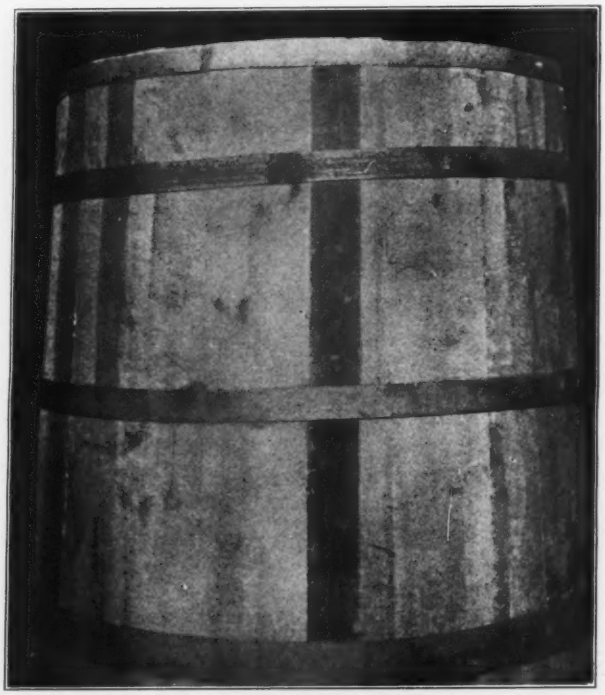
it occurs, it was long almost the only building material. Its long clear trunks, straight grained and easily split, rendered it a favorite with the man who hewed out timber and "boards" with a broad ax. As a fence wood, it rivaled the popularity of chestnut in other sections. Rails and posts made from it were not only easily split, but were very lasting. For posts, the "fat" pine was used. The butts of fire scarred or turpentined trees accumulate an excess of resin which renders them very durable. Such pieces are called fat, and are sought after for positions in contact with the soil. These fat pieces are also known as lightwood, and will burn at the touch of a match. They are collected and sold as kindling material in Southern cities.

Even before the Revolution longleaf was exported. The first shipments were made to Cuba, the West Indies, Mexico and Central America, where it outlasted the native timbers. It early figured as a shipbuilding timber, and exports for this purpose were made to England in pre-Revolutionary days. Because of its weight, it could not compete with white pine in supplying the largest sized masts, but masts for smaller vessels, as well as yard arms, booms and bowsprits for larger ones were made from it.

Writing in 1810, Michaux says that longleaf from North Carolina and Georgia commanded 25 to 30 per cent higher prices in England than any other pine from the United States. After the Revolution exports continued to increase, and by the outbreak of the Civil War, it had secured such a firm foothold for general construction purposes in the English market as to drive out the pine imported from Scandinavia and northern Russia. The early exports for lumber were mostly in the form of "squares" rough hewn by hand, and hauled long distances by ox teams or floated down the streams to the seaports.

A WOOD IN DEMAND THE WORLD OVER

Today there is hardly a country in the world to which longleaf pine does not go. It is estimated that a billion and a half feet of southern pine is exported annually and that longleaf comprises the bulk of this enormous amount. This places it as the leading export wood of America. Its nearest competitor is Douglas fir. Most of the longleaf is shipped from the ports along the south Atlantic and Gulf Coasts. Europe and South America take the bulk of the supply. It is estimated that 8 per cent of the total cut of the Southern pines is exported. At the outbreak of the European War, the yellow pine lumber trade was paralyzed to a greater extent than that of any other wood.



LONGLEAF FOR VATS, TANKS AND SILOS
This wood is second on the list of woods used for these articles, the staves being generally made from the heartwood of the tree.

Photo by P. L. Buttrick.

A TIMBER PRESERVING PLANT IN LOUISIANA

Although the heartwood of longleaf pine, if free from timber-destroying fungi, is very durable, yet more and more of it is being treated with preservatives to increase its durability. This plant treats railroad ties, paving blocks, structural timbers and other products.

No very great improvement is looked for till the close of the hostilities, when it is not too much to expect that billions of feet of longleaf will be used to repair the ravages of war in the various war zones.

Longleaf was favorably known in Europe and the West Indies before it secured much of a foothold in the northern market of our own country. The white pine regions of Pennsylvania and Michigan were much nearer, and the people were more accustomed to that wood than to its southern competitor, so that, although it was introduced into the northern markets in the seventies, it was not looked upon with favor. In 1892, when the cut of white pine was over 9,000,000,000 feet, that of longleaf was estimated as 7,000,000,000 feet. Its use did not become general till the supply of white pine waned, but today it has come to its own, and it is shipped by water and rail clear north into Canada and is used amid the stumps of the old pineries of Michigan and Wisconsin. It travels west to the foot of the Rocky Mountains, and disputes the markets there successfully with its western competitors. The annual cut is estimated at 12,500,000,000 feet, its nearest rival is Douglas fir, which is estimated at 5,200,000,000 feet. Its old rival, white pine, has fallen off to about 2,500,000,000 feet. So far as statistics go, 1907 seems to have been the banner year, when a cut of 13,215,185,000 feet was reported.

Like the white pine industry, the longleaf industry has moved ever onward, seeking new and virgin supplies.

LONGLEAF PINE FOR CAR CONSTRUCTION

This wood is extensively used for both passenger and freight cars, being especially desirable for frame work, sills, siding and flooring.

Starting originally in North Carolina, it has moved south along the Atlantic to Florida and then west along the Gulf to Louisiana and Texas. This movement was at first slow, and North Carolina retained for many years its leadership, which then passed to Georgia (it was as Georgia pine it captured the markets of the North), and from there to Alabama and finally to Louisiana and Mississippi. Texas is the last frontier of the longleaf, and may have its turn at leadership before the tale is told.

TURPENTINERS WASTED VALUABLE TIMBER

At first the turpentiners led the van, searching out virgin timber, "boxing" it and leaving it to fire and windfall when it would yield no more resin. The lumberman harvested such trees from these depleted orchards as he could use, but many of them were destroyed before they were needed for lumber. With the greatly increased demand for lumber, the lumberman pushed ahead, and now has passed the turpentiner and is working largely in unbled timber.

The early mills were small water power affairs, located close to the timber. But the Census of 1820 mentioned a steam sawmill in Brunswick County, North Carolina, operated by a 20 horse power engine, and using 24 saws. Its crew was given as 16 men, and its cut as 400,000 superficial feet per annum. Later larger mills were located at the towns on the larger rivers and timber was rafted down to them from the pineries far up stream. At first ox teams were used to haul the logs to the rivers, but as it became necessary to go further back from the river banks, and operations assumed a larger and larger scale, tram roads were built into the timber, and logs were hauled on them to the rivers. Now, however, nearly all logs are railroaded directly to the mills, which are generally located on trunk line railroads. The mills too have increased greatly in size, and the longleaf region boasts some of the largest and most completely equipped sawmills in the world. These great mills run day and night, year in and year out. The smoke from their stacks covers the landscape and at night the glow from their refuse burners lights up the sky like miniature volcanoes. The roar of these great mills as they turn out hundreds of thousands of feet of lumber a day, destined for all the world, can be heard for miles. These gigantic operations take a strong hold on the imagination, and one takes off his hat to the genius of the American lumbermen who have created them. Perhaps when these great mills are dead, and the armies which operate them are scattered to the ends of the earth, the pineries will have become a new forest or a prosperous farm land. One wonders.

It is interesting to glance for a moment at the men who have brought these changes about. The original develop-

Courtesy The Southern Pine Association.

LONGLEAF PINE "EDGINGS" USED FOR THE MANUFACTURE OF KRAFT PAPER

The making of paper pulp from Longleaf pine is an industry which is just beginning to grow up in the South. Mill waste is chiefly used for this purpose. In the interests of conservation this industry should be increased. The Forest Service tests prove that the quality of "Kraft" papers manufactured from longleaf pine surpassed in strength and toughness any other produced in this country or abroad.

LONGLEAF PINE USED LARGELY FOR WOOD BLOCK PAVEMENT

While several coniferous woods are used for wood block pavements, fully eighty-five per cent of the total amount of raw material used for this purpose is yellow pine, principally longleaf. More and more cities are adopting wood block pavement or extending that already in use and it is expected the consumption of longleaf pine for this purpose will steadily increase.

ment of the naval stores industry was undertaken by the settlers of North Carolina, and the descendants of the original Tarheel turpentine men are found in every turpentine-producing state. The lumberman, on the other hand, particularly along the Gulf, are often Northern men. Many of them are from the white pine regions of the Lake States. The longer visioned of the white pine men, foreseeing the exhaustion of that wood, cast about for other timber supplies. Some went west; others located in the Southern pine region. Many of the latter bought up Government land in Louisiana and Mississippi at $1.25 per acre, the timber on which is by now worth from $2.00 to $4.00 per thousand feet.

To enumerate all the uses to which longleaf can be put is almost to catalog the uses of wood itself. Heavy construction, shipbuilding, housebuilding, interior finish, machinery, railroad ties, freight cars, paving blocks, box boards, shingles, wood pulp; and we have named but a partial list.

WEIGHT FOR WEIGHT STRONGER THAN STEEL

Longleaf may not be the strongest of woods, but it is one of the strongest which can be obtained in large dimensions and amounts, for the strength of wood is roughly proportional to its dry weight and longleaf is almost as heavy as oak, being the heaviest of the important conifers. Weight for weight, it is stronger than steel. Individual pieces of longleaf, as of any wood, vary in weight, hence in strength. The weight is roughly proportional to the density, which

FRUIT AND VEGETABLE PACKAGES

These are made of one-eighth inch rotary cut of longleaf pine veneer, the longleaf being an important wood in this industry and grouped with the other southern yellow pine stands third in the list of woods used for this purpose.

is determined by the size of the annual rings and the proportion of dense or "summer" wood which they contain. Lumbermen and timber engineers are discussing the adoption of revised grading rules which shall take these facts into account and will result in furnishing to consumers longleaf timbers of a uniform strength as well as freedom from defects. Longleaf pine is also one of the most durable of important structural woods, both in air and in contact with water or in the soil. It is possible to obtain clear sticks in dimensions up to 14×14 inches by 70 feet, and there are records of some even larger. Derrick booms, masts, flag poles, trestle beams, and timbers for buildings of the slowburning or "mill frame" construction type demand these timbers. A rather unexpected use came to the attention of the writer recently when he saw an order for longleaf timbers to build the framework for targets for big gun practice in the Navy.

We are hearing a great deal these days about the danger of using wood for construction purposes, since forsooth it will burn. The fact has been advertised as if it were a recent discovery, at the same time those most interested in circulating this interesting bit of information have failed to inform us that steel will melt and cement will crumble. If a longleaf timber and a steel beam constructed to support the same load are placed side by side and subjected to a fire of the same intensity the steel beam will become red hot and bend under its load before the longleaf beam will have burned through and broken. A fire hot enough entirely to consume longleaf timbers of any size will reduce an unprotected steel beam to a mass of twisted iron. Indeed it is very difficult to burn a longleaf timber entirely away, and it will scarcely consume itself without added fuel. For this reason, engineers and architects still specify longleaf timbers for certain kinds of construction, and are more concerned in securing longleaf which meets their specifications, and is free from dry rot, than in securing a non-organic substitute. Where both are supplied with automatic sprinklers, buildings of the "slow-burning" or "millframe" construction type are insured at the same rate as semi-fireproof buildings of steel construction. Most millframe construction is built of longleaf timbers. Wooden rafters for gymnasiums, halls, churches and other public buildings, where the overhead construction is in view from the interior are much more attractive to the eye than steel beams. Longleaf is well adapted to such uses, because of its strength, attractive appearance, cheapness and the ease with which it can be obtained in suitable dimensions.

Longleaf is used for house building in enormous quantities. It is particularly suitable where the same boards appear on both inside and outside of the structure, the reason being that it is strong and durable, holds paint well and at the same time is attractive in the natural wood, for its slow growth and large proportion of dense summer wood give it a pleasing yellow and brown banded appearance. Shortleaf Southern yellow pine is perhaps

LONGLEAF PINE USED FOR PILING

The longleaf is extensively used for this purpose because it is particularly desirable for any heavy timber work, and because of its durability. Weight for weight it is stronger than steel. It is also in demand for derrick booms, masts, flag-poles, trestle beams and timbers for buildings of the slow burning or "mill frame" construction type. Its most recent new use is for the frame work of targets for big gun practice in the Navy.

more perfectly suited to fine interior finish. As it ages, the color of the wood changes from a light yellow and brown to a rich golden brown which takes a fine polish and becomes extraordinarily beautiful.

IN A CHURCH OF REVOLUTIONARY DAYS

There is an old Episcopal church at Raleigh, North Carolina, built in Revolutionary times. It is of stone. Its rafters, pews, and other furnishings are of prime longleaf, finished in the natural wood, now darkened and deepened in color by age. One has a new conception of the value of this wood for decorative purposes after a visit to this cathedral-like building. It is a pity that more manufacturers do not specialize in the curly grained pine which has as pleasing grain and color as curly maple, and could be sold much cheaper.

As a general flooring wood, longleaf has no superior, whether it be thick planking for mills and factories, where strength and durability are the consideraton, or in the home of the average citizen, where it combines inexpensiveness with beauty and utility. The so-called edge-grain, quartersawn, or rift flooring is the most durable, and takes the best polish.

We can pause to discuss only lightly a few of the other uses, one of the most important being car stock. More American railroad cars are built of yellow pine, chiefly longleaf, than of any other wood. Although we have no statistics at hand to prove it, it is almost safe to assert that more freight cars are built of it than of all other American woods combined.

In the last few years the popularity of wood paving blocks in our cities has increased. They are soundless, sanitary and very durable if treated with preservatives and made of the right kind of wood. They are also easy both on the feet of horses and the tires of motor vehicles. Yellow pine, because of its hardness and density, meets these requirements, and it is far and away the leading wood for this purpose.

LONGLEAF PINE TIMBERS

The most important of the yellow pine group for heavy structural and bridge timbers is the longleaf. Owing to its strength and last properties it was long considered supreme among American woods as a structural timber and only with the exploitation of the forests of the Pacific Coast in the last decade has it had to share this place with Douglas fir.

In 1907 the railroads of the country purchased 34,215,000 yellow pine ties. The life of an untreated longleaf tie averages between 5 and 7 years, which compares favorably with that obtained from white oak or locust and other hardwoods. Many of these ties are hewn. Dead trees are often preferred, only the seasoned and durable heartwood being used. Many are treated with chemical preservatives.

An industry is beginning to grow up in the South in the manufacture of paper pulp from longleaf, chiefly from sawmill waste. It is in the interests of conservation that this industry be increased, since the waste from the manufacture of Southern pines is far in excess of what it should be. Tests by the Government Forest

Service proved that the quality of "Kraft" papers made from longleaf pine surpassed in strength and toughness any others produced in this country or abroad.

GRADES AND PRICES

We have no way of knowing the price of longleaf in the early days, but it must have been very low. Even now it is low compared with some other woods of anything like its high quality. The average selling prices at a large mill in Louisiana for the year 1913 are as follows:

Timbers above 4" sq.	$21.12 per M feet
Timbers 2½ to 4" sq.	17.99 per M feet
"A" Edge grain flooring	36.36 per M feet
"B" Edge grain flooring	36.29 per M feet
"C" Edge grain flooring	25.70 per M feet
"A" Grade boards	30.08 per M feet
"B" Grade boards	24.04 per M feet
"C" Grade boards	23.43 per M feet
No. 1 Common	17.83 per M feet
No. 2 Common	12.98 per M feet
No. 3 Common	10.75 per M feet
Box Shooks	15.08 per M feet
Moulding	24.54 per M feet
Lath No. 1	1.78 per M
Lath No. 2	1.15 per M
Shingles	2.41 per M

The mill run at the time was about $16.50 per M as compared with $19.00 for white pine.

FUTURE OF THE LONGLEAF

The original area of the longleaf range was slightly in excess of 100,000 square miles, over most of which the tree grew in pure stands. Assuming an average stand of 5,000 feet to the acre, the original stand would have been 320,000,000,000 feet. The original stand of white pine is estimated to have been 450,000,000,000 feet. The longleaf estimate certainly seems conservative, since the annual cut for the last ten years has been in excess of 10,000,000,000 feet per annum and in 1913 the remaining stand was estimated at 232,300,000,000 feet, or about one-twelfth of all the standing timber in the United States. The estimated stands of western yellow pine and Douglas fir alone exceed that of longleaf. The longleaf pine stand by States is as follows:

North Carolina	2,900,000,000
South Carolina	4,600,000,000*
Georgia	18,500,000,000*
Florida	58,200,000,000*
Alabama	25,600,000,000*
Mississippi	47,600,000,000
Louisiana	52,500,000,000
Texas	22,400,000,000

*Includes some Cuban pine.

That seems a huge supply, but experience has proven that no wood is inexhaustible, even though the supply may last longer than is at first predicted. The average rate of cut for the past few years has been about 12,000,000,000 feet per annum, and it is thought to have reached its maximum. At this rate the supply of virgin longleaf will be gone in 20 years. It will probably last slightly longer, since the maximum cut cannot be maintained clear to the point of exhaustion. Companies exhaust their holdings and are unable to secure more stumpage; with the restrictions of output comes an advance in price, resulting in a substitution of other woods, and a lessened demand, more conservatve cutting and milling methods are introduced; all of which help to stretch out the supply. It is therefore safe to assume that virgin longleaf will last at least 25 years, but will be gone in 35.

LITTLE HOPE FOR SECOND GROWTH

But what of the second growth; has the longleaf, like the white pine, a future as a second growth tree? The answer, unfortunately, seems to be "No." Technically it is possible to reproduce longleaf, and if the pine barrens could be constituted a forest reserve, and handled simply from the viewpoint of forest management, the tree might be perpetuated commercially, but as it stands this seems scarcely possible. For longleaf does not "come back" after lumbering. It seeds very infrequently and grows slowly. Young growth scarcely ever comes in under the shade of the older trees, and in the openings it is kept out by fires. When the area has been logged, the burning of the slash, which invariably follows, kills all the smaller trees which have been left, and the annual grass fires, together with the absence of seed trees keep more from coming in. So longleaf has become commercially, almost botanically, extinct over whole sections and they are now barrens indeed. North Carolina, formerly the pine tree state of the South, hardly knows it now as a commercial tree. There are no counterparts to the second growth stands of white pine which occur in portions of New England, in the longleaf range. Nor does the species lend itself to artificial reforestation. It sends down into the soil a strong, deeply penetrating tap root, almost before it has developed any top at all, which prevents its satisfactory cultivation in the nursery.

An article on shortleaf pine will follow this shortly. Commercially the longleaf and shortleaf are both known and sold as yellow pine, but there is such a difference in their characteristics that separate articles describing them are warranted.—Editor.

AN IMPORTANT CONFERENCE

ON SEPTEMBER 22 at 9 in the morning, Secretary of Agriculture Houston will meet representatives of the American Forestry Association, of several State forestry associations and of Chambers of Commerce from the larger cities on the Atlantic Coast to discuss the proposal to ask Congress to make an appropriation of $10,000,000 to continue the purchase of Federal forest reserves in the White Mountains and Southern Appalachians. There is hope that such an appropriation may be provided, in which event it will be possible to continue such purchases as have already been so wisely made.

Forests in the War Zone

DISPATCHES and special reports from various points in Europe differ as to the damage done to forests within the war zone and to the effect which the cutting, destruction by artillery fire, forest fires, and by the logging and marketing of timber from the forests in enemy's territory which has been captured, will have on forest conditions in the future.

Some of these reports are here given for what they are worth and because they are interesting.

A special newspaper dispatch from Bar-le-Duc, France, says: "The splendid forests of the Argonne, as well as those of the Alsatian slope of the Vosges Mountains and of the Woevre, are being gradually razed by shell and shrapnel fire. Of the majestic pines that covered these heights there remain only hacked and blackened stumps and a wild tangle of fallen trunks.

"Germans and French have cooperated in this devastation, but the greater destruction is credited to the intense, concentrated fire of the 3-inchers and 6-inchers that alone could dislodge underground German fortresses. There is said to be abundant evidence that all the ground had been carefully plotted and the ranges taken by the Germans before the battles. On many occasions French detachments following obscure paths unknown to any but the woodmen of the region, fell a prey to the fire of German gunners, for whom there seemed to be no secrets in the thickets of the Argonne. Against the advantages of preparation, the French had but one resource—a complete upheaval of the entire ground by concentrated artillery fire. If the French succeed in driving the Germans finally into the open, the priceless forests of the entire region of the Argonne from Bar-le-Duc north will exist no more."

Photo by Underwood & Underwood, New York.

FRENCH FOREST DESTROYED BY GERMAN SHELLS

This forest land in the northwestern part of France sheltered several British regiments until the Germans discovered them, and, concentrating a terrific artillery fire on the woods, drove the British out and destroyed the trees, as the photograph so well illustrates.

Another dispatch, this time from Paris, quotes a well-known Frenchman as saying that forest preservation is necessary to maintain population. It says:

"Paul Descombes, discussing the progressive depopulation of France, gives some statistics to show that the thinning of the woods and forests is largely responsible. There are thirty-one French departments that are more or less mountainous. These now have 8,094,940 inhabitants. If the old rate of increase had been maintained, their population now would be 11,896,366. Monsieur Descombes points out that the mountainous regions of Switzerland, which should not be any less favorable to repopulation than the mountainous regions of France, show an increase of more than 50 per cent in population during the last sixty years, and he attributes it to the fact that forest protection in Switzerland is far more rigorous than in France."

A cablegram from Amsterdam says: "Tremendous forest and moor fires are raging in various parts of

Photo by International News Service.

A FRENCH OBSERVATION POST

Here the trunks and branches of trees in one of the French forests have been cleverly used in an effort to shield and to hide an advanced post.

Silesia, according to the Berlin Tageblatt. Around the district of Wittchenau some villages have been evacuated, and war prisoners are engaged in throwing up trenches to assist the fire brigades in fighting the fires."

A newspaper article widely printed in the United States says: "It is reported that the French and German Governments are utilizing war prisoners for reforestation work. It is said that vast forests have been entirely destroyed by the fighting. The ground in many places is absolutely sterile, the announcement says, because of fumes and gases from bombs and explosives of various kinds. It is understood that the French Government is paying fifty cents per day to the German prisoners for the work. The regular foresters are all at the front."

A correspondent of the New Orleans *Lumber Trade Journal,* who is a petty officer in the German Army commanded by Von Hindenburg, contends that the forest destruction in the war zone is not so great as some reports indicate. He says:

"Lately I have often had the opportunity to visit the battlefields of the glorious victories of Marshal Hindenburg near Tannenberg and round the Masurian seas. It was evident that the effect of the war in general on the forests was not so great by far as some forest experts feared. Naturally in those parts of forests in which fights have taken place, and that were for a longer time covered with showers of cannon balls, a great number of trees have been broken and much more have been wounded. Even the mills in later time will have some trouble in cutting this wood, as every now and then rifle balls and pieces of iron from exploding shells have penetrated into the wood. But compared with the whole of the East Prussian forests, the direct losses of trees are small. A very interesting feature in those parts that were occupied by the Russians during the last winter are the numerous subterranean rooms, that in one place alone, as I calculate, may have given shelter for more than 10,000 men. For miles long the soil of the forest is holed in this way. All rooms have been covered by wooden props and earth. Many thousand cubic feet of wood from smaller trees are used for that. At other places, as, for instance, the wonderful street along a small channel, the old oak, willow and elm trees have been cut by the Russians to get free shooting. But on the whole these devastations of wood offend more the feeling and the love of nature than that they are important in the sense of forest economy.

"By far more important are the devastations of edifices. It is highly interesting to see that these devastations stop immediately at the old Russian frontier. If the Russians say that the destructions are caused only by some undisciplined people, such as Cossacks and Tscherkessians, this fact proves the contrary, for an undisciplined troop makes no difference between its own and foreign country. The destructions are caused by the direct order of Russian army commanders who have ordered the destruction of all public and private property of the country. One may calculate that in this way more than 20,000 houses have been burnt at places where never a gun has been fired nor a fight has taken place. From 10 to 20 million cubic feet of timber, mostly of German pine, will be wanted for the reconstruction of these houses.

"In the timber market, so far as foreign timber is concerned, the situation is practically unaltered since my last report. Ash is wanted at all times, but the price is falling a bit."

The Bird Department

By A. A. Allen, Ph.D.
Assistant Professor of Ornithology, Cornell University.

OUR VANISHING SHORE BIRDS

WHEN our forefathers first turned their attention to the hunting of birds either for food for sport, it is recorded that they found the woods from Maine to Florida teeming with wild turkeys; the air filled with clouds of wild pigeons, the lakes and marshes covered with waterfowl, and the shores animated with countless thousands of snipe and plover.

Today the turkey, in its wild state, is unknown except in a few remote and inaccessible places; the last passenger pigeon died a year ago in the Cincinnati zoo; the geese and the ducks are so reduced in numbers that one species, the Labrador duck, has not been seen in forty-five years, and another, the wood duck, has been practically exterminated over a large part of its range. The same is true of the shore birds. The Eskimo curlew is almost extinct; the long-billed and Hudsonian curlews, the avocet, the stilt, and the godwits are found only in small numbers, and even amongst the smaller species single birds now grace the shores where once great flocks assembled.

"SAND PEEPS" IN FLIGHT

These birds, the least and semi-palmated sand pipers fly in such flocks as shown in the photograph. This flocking habit has caused the near extinction of many species. Frequently a large number of a flock are killed at a single shot by an unscrupulous gunner.

The cause is not difficult to discover. The cutting of the forests and the increase in the numbers of hunters were sufficient to destroy the turkey; the gregarious habit of the passenger pigeon, making possible the slaughter of countless thousands on the breeding grounds, annihilated this species; the automatic gun, the market hunter, the greed of the sportsmen, and the shooting of mated birds in the spring of the year wiped out the waterfowl. At this point the vast army of gunners, having no other game to hunt, equipped with automobiles so that no place is inaccessible, turned loose on the shorebirds, and little wonder is it that the snipe and plover decreased and are now rapidly disappearing. First the larger species gave way before the onslaught and now the smaller, until even the little "sand peeps" that trot along the beaches and chase the receding waves are not safe from destruction. The small boy with his newly acquired rifle, and the amateur with his shotgun pick them off as they stand in a row asleep on the sandpit. The professional hunter fires into their densely massed ranks as they swing by to see how many he can kill at a single shot.

This flocking habit has helped the near extinction of other species as well, although the true sportsman, however great the temptation may be, never takes advantage of it. But the number of true sportsmen is relatively small, and the number of hunters who realize that to kill a dozen birds at a shot provides insufficient sport for the great reduction in the supply of game is still smaller. With these birds the sport of hunting is reduced to a minimum, the lust of killing raised to a maximum, and economy ranks lower than did forest conservation with the early settlers. Far better that the temptation of shooting into these flocks be removed from the unscrupulous and that these birds be protected for all time.

Among the "shore birds," however, there are two species, the Wilson's snipe and the woodcock, which do not have this flocking habit and which, except for their small size, fulfill all the requirements of first-class game birds. They lie close and unseen by the hunter until, with a startling call or whir of the wings, they bolt into the air on an erratic course which requires all the hunter's skill to intercept. Even when traveling in scattered flocks, they get up singly so that only one bird can be killed at a shot, thereby yielding the greatest amount of

sport for the number killed. It would seem, therefore, that these birds ought to be able to hold their own but, unfortunately for their preservation, they do not fly far when frightened, thus allowing the hunter several trials if he is not successful the first time. Furthermore, when they have finally reached their winter home in southern United States, they seldom leave the thicket or wet

A LESSER YELLOW LEGS

Single birds now grace the shores where once great flocks assembled.

meadow which they have selected until it is time to return once more to the north. Here, therefore, the gunner is able, by hunting over the ground day after day, unless the number killed is limited by law, to annihilate all the birds wintering in the vicinity. In fact, there is a case on record of a hunter in Louisiana who boasts of having killed 69,087 snipe in 20 years, an average of 3,500 each season, as many as 366 having been killed in a single day. The State game laws are further to blame because they have permitted the shooting to continue far into the spring, after many of the birds are mated and ready to leave for the breeding grounds. With such laws and such slaughter it is little wonder that the numbers of snipe and woodcock have rapidly decreased.

It is true that these birds are preeminent as game, serving man perhaps better in this capacity than in any other, and furnishing the largest return of legitimate sport for the smallest loss of game life, but limits must be fixed by law to govern the greed of what have been aptly called "game hogs," so that the number killed each year shall be distributed among the largest possible number of sportsmen; and the open season must be so adjusted that there will be no further decrease in their numbers.

It is fortunate that the United States Government realized in time that some action had to be taken, and now if public sentiment is sufficiently aroused, it will still be possible to preserve the remnant of these charming and valuable creatures and even to restock the depleted covers. The passage of the Weeks–McLean bill for the protection of migratory game and insectivorous birds puts the jurisdiction over these birds with the National Government and the regulations drawn up by our far-seeing United States Department of Agriculture now have the force of law. This Federal law removes all the smaller shore birds from the game list; likewise the fast-disappearing curlews, avocets, stilts, godwits, killdeer and upland plovers; it prohibits all spring and night shooting and equalizes the open seasons in all parts of the country. The law will be difficult to enforce. Already it has met the determined and organized resistance of market hunters, game dealers, hotelkeepers, and anti-conservationists generally. If it is to be effective in preserving for this and future generations one of the most delightful assets of our shores and marshes, it must have the recognition and active support of all true conservationists.

BIRD LIFE IN SEPTEMBER

SEPTEMBER marks the beginning of well-defined migration among birds. Shore birds of which we have been writing, the long-distance travelers, during this month arrive in greatest numbers, and it is now that the hunting season opens in most of the northern States. It is true that as early as July a few birds begin their southward journey and during August there is a general uneasiness felt among many species. But it is not until September that the general exodus begins. Most species migrate by night so that we do not see them passing, but if one goes out under the heavens almost any cloudy evening this month, he is sure to hear them calling to one another as they fly over. Cloudy nights are more satisfactory because when the sky is clear the birds fly higher, often several thousand feet above the ground and far out of hearing distance.

In addition to the shore birds there will be many other insect-eating species like the warblers, vireos and flycatchers, migrating, but few will be recognizable for their nocturnal calls are usually quite different from those we have come to know during the day.

During September one may look for many species that have not been about all summer, birds returning from farther north to their winter quarters. The first birds to leave in the fall are those that have farthest to go and most of these September migrants winter outside of the United States, either in Central or South America and some of the shore birds are not content until they have reached Patagonia.

One who has learned the birds only in their spring attire will be greatly disappointed with himself when he follows, for the first time, the flocks of fall migrants,

for few of the plumages will be the same. The once brightly colored warblers and tanagers have now completed their molts, changing every feather, and the males now resemble the obscurely colored females. There are more birds in the fields and along the borders of woodlands than there were during the spring when every tree seemed to burst with color and song, for the young almost outnumber the adults. But they are quiet now, only a few species are singing, and in their dull garb they pass unnoticed.

Another feature of bird life that is observable in September is the gathering of many species about fruit-bearing plants, bushes, vines and trees. One can observe which of the native shrubs are most attractive and therefore most desirable to plant about one's grounds. We will consider this phase of bird life in a later issue, but now is the time to observe. The drinking fountain and bathing pool mentioned in the last issue of this magazine will continue to be a popular resort for the birds throughout September.

At the Panama-Pacific Exposition

AMERICAN FORESTRY ASSOCIATION DAY at the Panama-Pacific Exposition at San Francisco—Wednesday, October 20—will find gathered for the meeting in the Lumbermen's Building on the Exposition grounds not only members of the American Forestry Association, but members also of the Western Forestry and Conservation Association, the Pacific Logging Congress, the Society of American Foresters, the Society of Canadian Foresters, the Biltmore Forest School Alumni, and a number of forestry and conservation organizations from California and adjoining States.

A general invitation to all who are interested in the work of the American Forestry Association to attend the meeting is extended by the Board of Directors.

The president, Dr. Henry S. Drinker, will preside and will speak upon the present forestry situation in the United States, and a member of the Western Forestry and Conservation Association will talk about the forestry conditions on the Pacific Coast.

A paper prepared by W. R. Brown, of Berlin, N. H., on the organizations of timberland owners in the East and in Canada for forest fire protection will be read by E. A. Sterling. Chief Forester Henry S. Graves will make an address on what the Government has found out about the lumber industry as a result of the recent inquiries relative to lumber costs and the domestic and foreign lumber markets. Executive Secretary P. S. Ridsdale will speak on the development of the Association's magazine, AMERICAN FORESTRY.

During the meetings of October 19, 20 and 21, in which the American Forestry Association participates with the Pacific Logging Congress and the Western Forestry and Conservation Association, there will be, among others, addresses on such important topics as: The year's lessons in private, State and Federal forest fire protection work; fire weather forecasts by the weather bureau and their use; forest fires caused by railroads, an actual record and what it proves; modern inventions adaptable to forest fire protection; the psychology of making public sentiment in favor of forestry; the business end of co-operative forest fire work; compulsory forest protection laws; can manufacturers, timber owners and forest fire protective agencies unite to advantage? Does the lumber industry need radical reorganization to protect producer and consumer? Is timber a speculation, a crop, or the necessary storage of raw material? The architect's responsibility for closer utilization of forest products; taxation and forestry: are we talking theory and neglecting facts?

One of the features which those who attend these meetings will particularly wish to see are the several forestry and lumbering exhibits, chief of which is the United States Forest Service exhibit. This alone is worth several hours' examination. There are also exhibits from the Philippines and several foreign countries, while many of the commercial woods have special exhibits. In addition to seeing these, many who attend the meetings will spend October 22 and 23 in the redwood logging camps at Eureka, California.

WISCONSIN'S NEW COMMISSION

PROF. FRANK B. MOODY of the Cornell Forest School and formerly assistant State forester of Wisconsin has accepted the appointment as a member of the State Conservation Commission of Wisconsin. This commission is the consolidation of the State Board of Forestry, State Park Commission, State Fishery Commission and Game Warden's Department. The other members of the Commission are James Nevin, who has been fish commissioner for thirty years, and W. E. Barber, a business man.

Aviator to Detect Forest Fires

QUITE the latest development in the protection of the forests from fires is the appointment of an aviator to detect any forest fires near Big Trout Lake in Wisconsin. He is L. A. Vilas, a relative of the late United States Senator William F. Vilas, of Wisconsin. Using his hydroaeroplane and arising from Big Trout Lake, Mr. Vilas in a few minutes can reach an altitude of 1,000 feet and from that height can survey some 200,000 acres of forested land. If he detects smoke indicating a fire in the forest he can report in a few minutes more to the State Forestry headquarters for the district and in a very short space of time state forest rangers can be placed along the line of the fire.

The use of a flying machine is particularly valuable for this kind of work where the country is flat or where there are no high elevations upon which lookout stations may be placed. In flat or rolling lands lookout towers enable the observer to guard a territory of rather small area, whereas Aviator Vilas at the height of 1,000 feet can detect a fire thirty or forty miles away from the lake.

While appointed by the State Forester, Mr. Vilas accepts no remuneration, volunteering his services. In writing to AMERICAN FORESTRY about the work, Mr. Vilas says:

"I greatly appreciate the interest you show in the part the flying boat is taking in detecting forest fires. The machine I am using is a standard Curtis four-passenger flying boat with a Curtis eight-cylinder V type 100 horsepower motor. This machine has an average speed of about sixty-two miles an hour in the air and forty miles an hour in the water, with a climbing capacity of 1,000 feet in three minutes. At an altitude of 1,000 feet a fire thirty or forty miles away is distinctly visible.

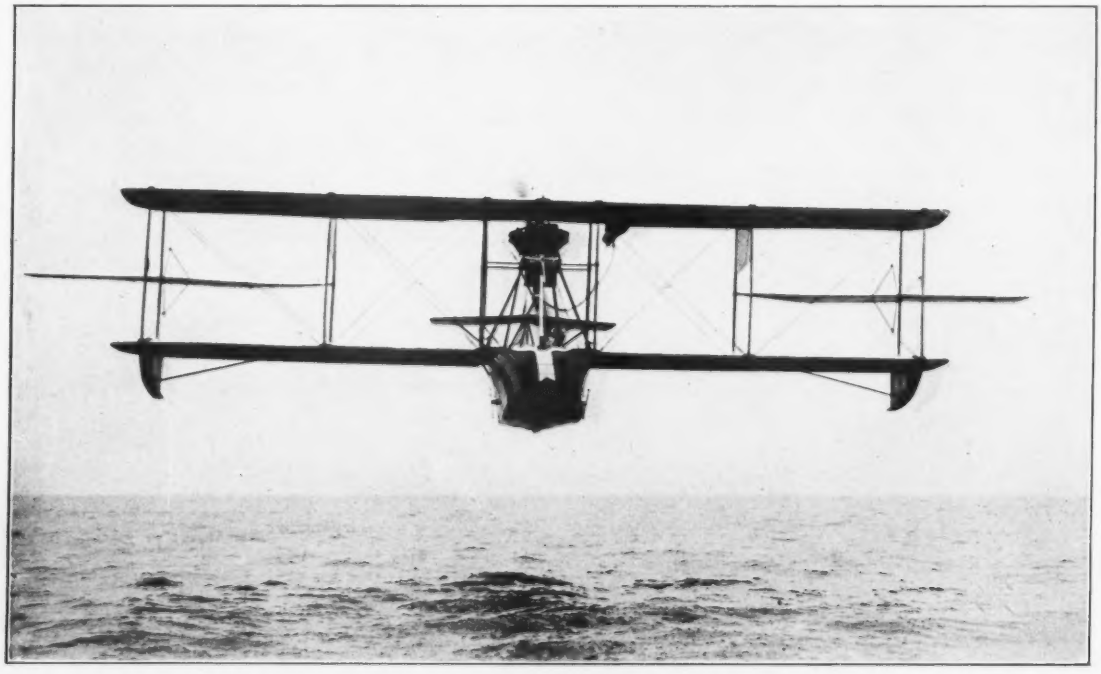
"I usually am flying every evening around six o'clock and I always reach an altitude which enables me to see about forty miles in every direction and if I do see indications of fire I can report to the Forestry headquarters at Trout Lake within three minutes."

E. M. Griffith, who has recently resigned as State Forester of Wisconsin, said:

"It is generous of Mr. Vilas to offer these services to the state without charge. The other day I made an ascent with him and we detected a fire. By communicating with the rangers when we came down, we found that it was a settler doing some clearing. The hydroaeroplane will reach the place of a fire in only a few minutes, where otherwise hours would be consumed."

Mr. Vilas recently discovered a fire thirty miles off and on investigation it was found that he had made an accurate estimate of the distance.

Mr. Griffth said that at an altitude of about 1,000 feet it is possible to clearly view all of the state forest



HYDROAEROPLANE USED FOR FOREST FIRE PROTECTION WORK

This machine which has an average speed of 62 miles an hour in the air and 40 miles on the water, with a climbing capacity of 1,000 feet in three minutes is used by L. A. Vilas who has volunteered his service to protect the forests near Trout Lake, Wisconsin, from fire. At a height of 1,000 feet he can survey 200,000 acres of forested land and in a few minutes can report any indication of a forest fire to the State Forestry Department headquarters for the district.

AVIATOR L. A. VILAS

With his hydroplane Mr. Vilas is aiding in protecting the forests near Trout Lake, Wisconsin, from fire. His work in behalf of the State Forestry Department being the first time that a flying machine has been used for forest fire protection.

reserve lands in Vilas county. He declares that the ascent which he made with Mr. Vilas was 1,600 feet and the 1,200 lakes in the county at that high altitude was one of the finest panoramic views that he has ever seen. The hydroaeroplane is known as "L. A. V., II." This is the second machine that Mr. Vilas has owned. Mr. Vilas is familiarly known in aviation circles as "Jack" Vilas, and about a year ago came into prominence by reason of his flight in a machine across Lake Michigan.

TEXAS STATE FORESTER

TEXAS, which recently passed a State forestry law, has selected J. H. Foster, professor of forestry in the New Hampshire State College and forester of the State's Agricultural Experiment Station, as State forester.

Mr. Foster is a native of Massachusetts, and is thirty-five years old. He was graduated from Norwich University in 1903 and from the Yale Forest School in 1907. After leaving Yale he entered the United States Forest Service as a forest assistant, and in 1910 was promoted to assistant chief of State cooperation. His principal assignments were studies of forest conditions in Alabama, Mississippi, and Louisiana, the examination of forest conditions on the watersheds of the Allegheny and Monongahela Rivers, and the taxation of forest lands in New Hampshire. Mr. Foster left the service September 1, 1911, to become professor of forestry in the New Hampshire State College and forester of the State's Agricultural Experiment Station.

The position of State Forester of Texas, which he will assume about September 15, is one of the best positions of this kind ever offered, combining, as it will, all the forestry work undertaken by the State—administrative, teaching, and investigative. The work will be centered at the Agricultural and Mechanical College, at College Station. There will be a forestry department on equal footing with other principal departments of the college, which will administer the forestry law, including the fire protective system, management of State forests, and cooperation with private owners; and the State Forester will supervise the teaching work in forestry under the direction of the School of Agriculture, and the forest investigative work under the direction of the Agricultural Experiment Station. He will have an exceedingly free hand, and will be removed from politics as far as possible. It is expected that the relatively small appropriation of $10,000 will be considerably increased by the next legislature as the result of a constantly increasing interest in forestry work throughout the State. Mr. Foster will bring to the position a broad experience, and the State is certainly to be congratulated on the selection.

JAPAN'S FOREST LANDS

THAT the Empire of Japan has a forest preserve more than ten times the area of the New York State Forest Preserve was stated by R. Nakai, a director of the Japanese Forest Service, when he visited the Conservation Commission at Albany recently to inquire into New York State forestry methods. Mr. Nakai is in the United States on behalf of the Japanese Government, and is making a special study of reforestation and fire protection. He visited the New York State nurseries and tree plantations, and made a tour of a large part of the Adirondacks to observe the detailed workings of the State's system of fire prevention. Mr. Nakai expressed much interest in the struggle in the New York State constitutional convention to permit the commercial utilization of the forest preserve. In Japan, he said, which has a forest area of sixty-seven per cent of the total area of the country, the forests were sharply classified into "utilization forests" and "protection forests." The object of the "protection forests," he explained, is to preserve the safety of the land and further the welfare of the people. The protected area is over 18 million acres, against 1,821,614 in New York State. The forest land not owned by the state is subject to the control of the Government, according to the provisions of the Japanese forest law.

The Ornamental Evergreens

By Warren H. Miller

MANY years ago, Prof. Josiah Hoopes, member of the Academy of Sciences, Philadelphia, wrote a whole book on the evergreens. It is out of print now, but should be revived for the benefit of the tree lovers of this country, for it is a fascinating volume, and it covers the evergreen families and species of the known world. It is written from the viewpoint of the arboretum owner, the gentleman with a large estate, part of which has been devoted to a more or less complete collection of the evergreens of the world that are hardy in temperate climates. There were many such in 1868 when the book was written, and are yet for that matter, for there will always be wealthy men who love to collect beautiful trees and watch them grow and develop.

But, for the most of us, these things are not to be; we lack the land, for the duties of life require a habitation so near great cities that land is sold by the lot rather than the acre. But even for us there is no reason why even a small plot should preclude planting our surroundings with our more common ornamental evergreens, and if the matter is not overdone, quite a variety may be assembled without the place taking on the appearance of a museum.

On the writer's comparatively small home grounds in the forest of Interlaken there are sixteen different species of evergreens, many of them represented by half a dozen individuals—and the writer's own criticism of his place is simply that there are not enough of them as it is! Let us get acquainted with some of the more familiar ornamental evergreens used in house planting. Beginning with the Colorado Blue Spruce, easily the most ornamental of the spruces, the variety most often encountered is that known to nurserymen as Koster's Blue spruce. It is developed from the Parry spruce, the *Picea Parryana* of science, growing wild only in the canyons of southern Nevada, Utah and Colorado where it is known as the blue or silver spruce. As a rule it is a dull blue-green in its natural state, of little ornamental value, but occasional "sports" show a vivid light silver blue and shoots from these are grafted on seedling roots of the ordinary wild blue spruce, whereupon the resulting tree has the vivid light blue of the original shoot all over it and is known as Koster's Blue Spruce, being named after the nurseryman who first experimented with it. All the nurserymen keep it and a small specimen 2 feet high will cost you about $1.50, the plain blue spruce of the same size costing $1. It grows some 9 inches additional height and 18 inches spread each year, so give it at least 5 feet of distance to its nearest neighbor when planting. It seems to thrive equally well in heavy clay soil and sandy loam, provided only that the soil is well drained and not soggy and swampy.

Another standard ornamental evergreen is the Retinospora Plumosa, that silver-blue, fuzzy tree with dense, fronded foliage, usually trimmed close as a rounded cone or oblong ball. It is a good tree to fill in a corner in either house or hedge, and is always noticeable in any shrubbery in which it may be placed. A specimen three feet in diameter by 3 feet 6 inches high will cost $1.25

EVERGREEN PLANTING SUITED FOR CORNER OF A PRIVET HEDGE

Left to right—Hemlock; retinospora plumosa, one species of the popular Japanese cedar or cypress; Norway spruce; Japanese retinospora, which term applies to all forms of Japanese cedar or cypress; Koster's blue spruce, and American arborvitae.

and will grow anywhere but in a swamp. A third silver-blue evergreen is the Irish juniper, looking something like a common red cedar in form but its foliage is feathery light blue-green, thinner than cedar and growing up almost perpendicularly from the trunk. It makes a tall, narrow, graceful tree, and a specimen 4 feet high and a foot wide will cost $1.50. Whenever you want a striking vertical note in the shrubbery that is your plant. Good for a jutting out corner location where it will stand out boldly to be admired of all the world.

An exceedingly ornamental but costly shrub is the Biota Orientalis. It looks like a big golden-yellow egg set on end, and its leaf fronds all stick out edgewise like the leaves of a book. It is very dense and bushy, and a specimen 3 feet high would be worth four or five dollars, so the only way to rejoice in Biotas is to get them little and let time do the rest. A little one 16 inches high and 8 inches in diameter costs 75 cents, but, at that, gives you a striking yellow note in your mass of evergreens.

The basis of all evergreen planting should, however, be solid green masses of color in our own native trees such as the hemlock (almost as beautiful as exotic *R. plumosa*), the balsam fir, and our white cedar, the American arborvitae. These are all comparatively cheap, running from 75 cents to $2 in 24-inch to 4-foot specimens. The American arborvitae, beng long and tall, costs less in proportion to height, a 6-foot tree costing $1.25; while the hemlock which is feathery and bushy, is expensive in large sizes but it well repays the cost as it is undoubtedly the most beautiful of our eastern evergreens. With these will be wanted pines and spruces to give variety in shape and foliage, the white and pitch pines being the best American species, while the white and Norway spruces fill the bill for standard types of the shrubbery spruce. The white pine has five needles to the sheath, giving a feathery dark green foliage. The tree is symmetrical and distinctive in shape and makes an ornamental feature at some 'vantage point in front of a group of firs and hemlock. The pitch pine has coarse sap-green needles, three in a sheath, and thick bushy foliage, always a pleasing note of color in any shrubbery. Few nurserymen keep it, the substitute usually offered being the European Scotch pine. Both it and the white require at least 5 feet of room from their trunks to the nearest neighbor, and specimens 4 feet high and spreading 3 feet in diameter cost $1 to $1.50 each.

Among the spruces the best filler at the price is the Norway spruce, a large, handsome, dark green tree, 4 to 5 foot specimens costing 75 cents each. A good tree to put in an empty corner, to round out and soften the general contour of your house or hedge line. It ought to be planted not less than 8 feet from each face of the building in corners, and one should be careful about planting it in front of a window when a fine view is had, for the Norway spruce grows so rapidly that in a few years it would blot out your outlook. The white spruce, native of Canada, is smaller and if possible more symmetrical in shape. With its light green silvery foliage it is a most ornamental tree; 3-foot specimens cost $1. The balsam fir, belonging to the genus Abies, the pine family, has the same general type of growth, but flat needles, dark green above and silver white underneath. Its trunk is light gray, and the characteristic odor of balsam which continually exhales from the tree makes it a favorite planter.

In general your large inexpensive American evergreens should form the background of your masses of greens, with the smaller exotics in the foreground. In laying out each of the accompanying planting diagrams I had the pleasure of helping a neighbor whose house had just been finished in selecting and planting a suitable shrubbery for this place. The first is of a typical sub-

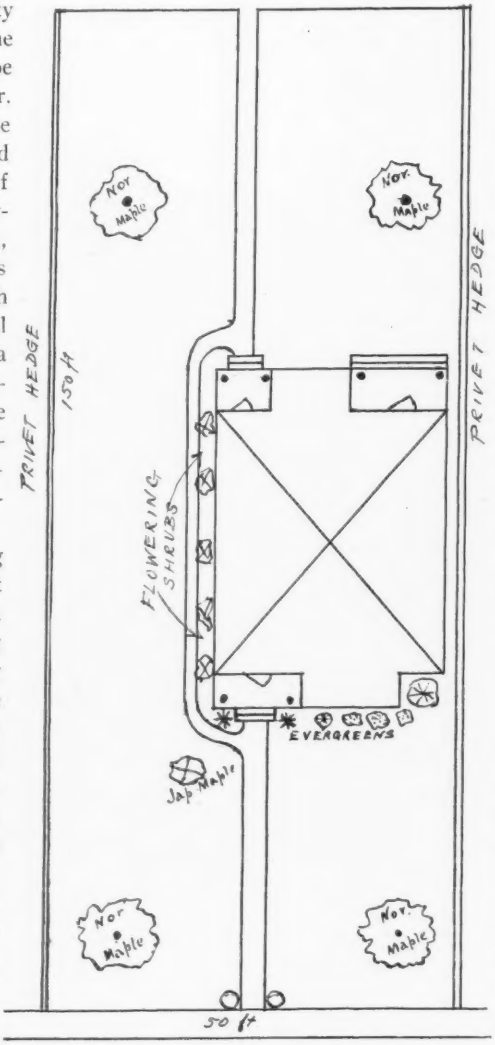
PLANTING FOR A SMALL SUBURBAN HOME

Left to right—Hemlock, retinospora plumosa, Irish juniper, Koster's blue spruce, Irish juniper, hemlock, thread branched retinospora plumosa and Norway spruce

urban home, located on a new development or erstwhile farm pasturage, a fine, handsome, stucco house on a raw and treeless lot. Four Norway maples had already been perpetrated upon the front lawn by the development company, thereby ruining any possibility of a deep, restful greensward. I advised the removal of the two central ones to the rear flanks of the house. These were 3-inch nursery specimens, easily transplanted because of the large, compact ball of roots which the root-pruning and transplanting at the nursery gives them, so there was no difficulty about moving them around in the proper season, which should be after the sap is down in October.

The front bay windows of the living room faced the street and under them I advised a border of the short and slow-growing evergreens, Retinospora Plumosa, American Hemlock, Nordmann's Fir (a short, squatty variety with thick dark green horizontal branches) one or two Biotas, a slender Irish juniper at one projecting corner (but not at the other, lest a banal symmetry overtake us) and in the deep re-entrant angle behind the porch, a 5-foot Norway spruce.

At the end of the walk leading up to the porch entrance we put in a small blue Koster's spruce on each side of the steps, this being the nearest approach to anything formal attempted. Along the south wall of the house went flowering shrubs, two deutzias, a wigelia and a forsythia (of which more anon). This was all—just a little suburban plot, which is the easiest thing in the world to clutter up with shrubs, we depended for the rest of our effect upon a small but untroubled lawn and a side border of privet hedge. I allowed him, however, one red Japanese maple, set about opposite the corner of the house, across the path on the south side on the narrow strip of lawn between it and the hedge.



Planting diagram suitable for a suburban cottage on a small lot. Frontage, 50 feet.

The second diagram shows a rather large place, 100 by 150 feet, the house in Dutch colonial on a low knoll, with a rolling lawn sloping down to the sidewalk. A privet hedge bordered this plot on both sides, with a small corner extending for some 10 feet along the front lot line on each side. These corners were filled with evergreen shrubbery of the following selections: In the angle of the east corner a retinospora plumosa, tightly clipped, forming a large globular cone of feathery blue-green foliage. In front of it a 2-foot Koster's blue spruce and a pyramidal Japanese retinospora, the three trees forming a triangle in the corner of the hedge. The foreground of this group consisted of a small 18-inch Biota Orientalis and a 3-foot Thread-Branched retinospora with an American pitch pine terminating the rear peak of the group. In the west corner, where the hedge corner was twenty feet on a side, the interior triangle began with a retinospora plumosa set in the corner, on each front of it an American hemlock and a Japanese retinospora, and in front of these four trees a small arborvitae, a 2-foot Koster's blue spruce, a Biota of about the same size, and a Norway spruce terminating the rear peak of the group. This would become a rather large tree in time and was therefore planted some 4 feet from the hedge, and, as in this case the planted area continued back along the hedge in a long sweep planted with roses and flowering shrubs, it was followed at once with a dense bed of rosa rugosa, whose persistent, glossy, dark green foliage made a fitting transitional selection to the deciduous shrubs. The rosa rogosa is that very spiny rose bush, with the large deep red flowers like the wild rose and the great red rose-apples, persistent and ornamental all through the winter. Pruned down close it comes up denser and thicker each season and a bed of them is always a striking ornament winter or summer, either as a border for a path or for a hedge.

The deciduous shrubs began with a rose magnolia, a fine flower bouquet in the early spring; then two forsythias (golden bells), conspicuous in the early spring before the leaves are out; then, along the narrowest sweep of the shrubbery came the roses, lots of them, all kinds, the pride and glory of the gracious lady who presides over all the growing things about this place. Behind these the bed curves out again to the driveway terminating the lawn, and we have more space for planting. Here were the larger flowering shrubs, three deutzias forming the foundation of the group, with a wigelia and two spireas (Van Houteii) in the foreground. Worked into this bank of flowering shrubs are different colored azalias and similar small bushes, and, terminating the bed where it reaches the driveway is a group of the spreading hy-

drangeas, the paniculata grandiflora variety, with their timmense mass of blooms flowering in August and throughout the fall.

Behind these flowering shrubs are dahlias in a solid wall. You may think that they would be blanked from sight by the shrubs, but their dark green foliage, on the contrary, forms a veritable bank or screen behind the shrubs, while the wonderful blooms, from August to December, which line the top of that wall of dahlias are a marvel to the eye, no less! They also serve as an f-

GOLDEN BIOTA

This is exceedingly attractive. It looks like a big golden yellow egg set on end and its leaf fronds all stick out edgewise like the leaves of a book.

fective screen to the fruit and vegetable garden back of them, which, with its tiny greenhouse and pergola showing above the top of the dahlia hedge is suggestive of solid comfort and good cheer to add to the more aesthetic joys of the flowers.

It will be noted that many old favorites seem to have been omitted from this planting. No shrubbery is complete without the old-fashioned lilacs and sweet syringias, to say nothing of the rhododendrons so often most mistakenly planted in the sun. They are, however, not in the general shrubbery, for we have a better place for them. Lilacs should be in a clump by themselves, a landmark, an emphasis for some such important details as a turn in the drive—and they were here so used. Sweet syringia has such a habit of growing so large as to almost require a bed to itself, and its striking beauty should be set off apart for the world to see. In this planting there are three of them, forming the principal shrubs, almost the only shrubs, in the circular bed which forms the round turn of the drive. Seen down the curve of the driveway the masses of cream-white blooms of those syringias are in themselves an invitation to drive in, if only for the pleasure of looking at them, and their fragrant perfume is a snare for many an unbeliever, who, passing by, is "overtaken unawares"—and converted into a rabid gardenist forthwith.

As for the rhododendrons, an ideal place for them was found along the northwest wall of the studio, where a fieldstone chimney rose under the shade of the big forest oaks and maples left standing when the lot was cleared. Also six English ivy plants set close to the chimney base, covered it in two years' time about twelve feet up from the ground, and around the base were massed half a dozen big rhododendrons whose glossy dark green leaves and purple, white and maroon blossoms are a veritable bank of color in the springtime.

In the northwest angle of the studio, where, because of the forest trees the sun never shines except for a brief

KOSTER'S BLUE SPRUCE

This is one of the most ornamental evergreens planted. A specimen this size will cost about $25, while the small ones are worth $1.50.

hour at high noon, we found a home for two hemlocks and a balsam fir, the latter in the angle as being the more pyramidal tree. Both of these species do well in the sun also, but where you have shade or partial sunlight they will get on quite as well, so that they are the best selection for such places, leaving the sunloving spruces and exotics for the east and south fronts of your building. The firs and hemlocks grow large, so beware of planting them under windows or in small beds and borders. Their beautiful feathery, fronded foliage and

aromatic odor should never be missing from an American evergreen planting.

The location of this property in the balmy climate of the New Jersey coast gave the owner an opportunity to plant some rare and beautiful evergreens, not hardy north of Philadelphia unless the climate is tempered by some such large body of water as the Atlantic or its bays. As the Colonial Dutch porch of the house was made of red concrete, 42 feet by 10 feet wide, laid flat at lawn level at the top of the knoll, it would ruin the effect to plant shrubbery or even vines anywhere near it. Only the most formal shrubs were allowed about the porch—two round-head box trees in red terra cotta vases between the columns of the porch and two pyramidal box trees in tubs at the head of the entrance walk. But at the southwest corner where the knoll fell off to the drive, was an opportunity for a few, a *very* few, striking evergreens. Easily the most conspicuous point on the knoll, with the distances of the driveway and rear garden behind it, whatever was put there would have to measure up to the honor of being placed as it were in the limelight. So here we planted a deodar, the East Indian cedar, a silver-green fountain of feathery fronds—one of the most unique and beautiful evergreens in the world. So far it has gotten through three winters, with a board screen behind it to protect it from the northwest wind and a liberal pile of leaves banked around it. It will probably live, in all its grace and beauty, for some fifteen years, and *may* reach the two-century grandeur of the one planted by Buffon in the Jardin des Plants. Once in a dog's age, however, we have one of those unheard-of winters, than which the memory of the oldest inhabitant knoweth not a worse—and then the deodar will be winter-killed.

In this group also is that beauty of the maple family, the Japanese blood-leaved maple, whose deep scarlet leaves vie with the golden bells of the forsythia in making the early spring lovely. All through the summer the tree color persists, with but a slight tinge of green, and it is not until late November that the leaves fall, when we still have a note of color in the glossy red twigs. It is a small bush, never getting to any great height, if judiciously pruned, and in this particular planting will probably reach 4 feet by 5 feet diameter at maturity.

A third plant is the thread-leaved retinospora, a quaint assemblage of feathery green ostrich plumes ascending a straight central trunk in regular whorls—a beauty, to make anyone stop and examine. In front of the group is a small intensely yellow and evenly shaped Biota, while, forming a thickener or background for the whole, is a bushy hemlock, a sister of the deodar in dark green.

Odd evergreens, however, quickly lead one astray into the domain of the arboretum or tree collection, a thing to be avoided, particularly on a small place. Your grounds are distinctly *not* a museum, nor can you afford to sacrifice the unity and restfulness of masses of evergreens for a bewildering variety of odd and curious trees, each clamoring for more than its share of the general effect. If you have a large place, however, a few of them can be indulged in. In northern localities the native white spruce is always an attractive tree with its regular conal growth and bright green foliage and it is hardy clear up to the Arctic Circle. Another odd tree is the queer northern cedar, a native of the Land of Little Sticks, with its dense spread of lower branches and funny little stalk of a trunk carrying a few rags of cedar foliage—a characteristic object of any sub-Arctic landscape. It appears to thrive all the better in moderate climates but still retains its cautious manner of growth, first spreading out a foundation of foliage and then sending up a wind-proof and frost-proof whip of a trunk.

In balmy climates you can also try the Umbrella Pine, a Japanese variety growing in a pyramid like a spruce,

A PLANTING FOR A LARGE COUNTRY HOME

Left to right—Retinospora plumosa, arborvitae and Norway spruce with arborvitae on each side of the porch steps. Beyond it left to right again: thread-branched retinospora, Irish juniper, biota orientalis, retinospora plumosa, arborvitae and Koster's blue spruce.

with the needles heavy and glossy dark green, arranged in umbrella-like clusters—one of the most ornamental evergreens in the world. Still further south, where the climate approximates England's, one can grow the South American araucaria outside. They are plentiful in England, reaching 2 feet trunk diameter and some 45 feet in height. With us they are sold as a hothouse plant, very ornamental, the branches in regular whorls of dark green needles sticking straight out from the branch, recurved, graceful and fernlike in appearance. I should say that it would prove hardy outdoors from Maryland south.

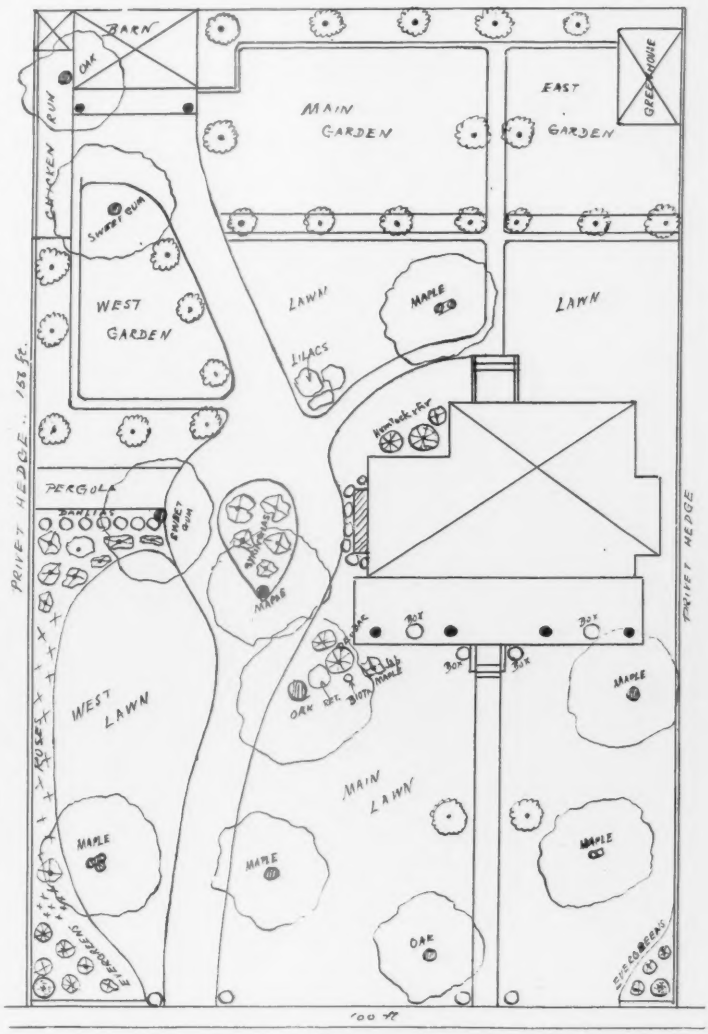
Another beauty, not hardy in severe climates, is the silver pine, *P. Excelsa,* a graceful and elegant tree with drooping silvery foliage, the needles like white pine but longer. A 4-foot specimen will cost $2, but the owner will get at least $10 worth of pleasure out of it.

None of these specimens should be "lost" in the mass of evergreens but rather emphasized by being planted at some conspicuous place about the grounds.

A word as to the flowering shrubs. There are eleven varieties of deutzias, nine spireas, four sweet syringias, and four wigelias, so you will do well to consult a good nurseryman's catalogue so as to pick out the ones you prefer. If you just order so many of each by name the florist will bring around the simple standard varieties, but there are many beautiful hybrids and special sorts which will well bear investigation before using up your available shrub space.

In general your evergreens will come to you with the ball of roots and earth done up in burlaps, while the shrubs will have had the roots cleared of earth and packed in moss. The former can be planted with the burlaps on, as it will soon rot away in the soil. Personally, if the earth is still compact and moist, I take off the burlaps as I always plant higher than the nursery advises, knowing well the tendency of gardens to rise, year by year, as more soil and manure are added. The roots of the flowering shrubs want dipping in thick mud before planting, and then the earth is to be well packed about the roots. A shovelful of well rotted manure is spread a few inches below the surface *after* the roots have been well packed in soil and finally a mulch of soft loose soil and manure is piled about the young tree at the surface. The best time for planting is August to mid-November; second choice, March to May first.

Finally, for the bulk of your evergreens, let me advise our American species, hemlock, cedar, spruce, balsam and pine; and for shrubs the good old-fashioned standbys—pink and white deutzias, pink wigelias, cream-white sweet syringias (or mock orange); spirea Van Houteii (the dear old bridal wreath with its rows and festoons of white dandelion-like flowers) and, lastly lilacs, lavender and white, without which May is not really the month of May at all. And roses; lots of them. No special soil required, but sunlight, at least from 10 to 4. No home yet ever had more roses than it knew what to do with!



Planting diagram for a suburban place with evergreens and flowering shrubs. Frontage one hundred feet.

American Trees in German Forests

By J. S. Illick

UPON examining the maps showing the distribution and the structure of the forests of Germany in the years 1300 and 1900, one will be astonished by the wonderful change that has taken place within a period that represents but a few generations of trees. Unquestionably man has played the leading part in effecting this change. A considerable portion of the history of Germany during these six centuries is written in blood. Frequent warfare between over two hundred independent states upon an area that now comprises the German Empire, and later the increase of population, the opening of agricultural lands, the development of industrial enterprises, and the destructive work of lumbermen present a picture of change and progress which enables us in part to comprehend the important rôle that man played in changing the original forest distribution.

The present structure of the German forests differs far from what nature originally placed there. Man has improved upon nature's methods by rearranging the indigenous species and by introducing exotic species. The major part of these structural changes came after the advent of forestry. The plains along the valley of the Rhine were originally covered mainly with hardwood species. The records of early military expeditions, as well as the structural material found in houses built centuries ago but still in existence, bear evidence of this hardwood forest. Today many parts of this same area are covered by a coniferous forest, in which Scotch pine is the chief participant. In the sixteenth century the Saxon "Erzgebirge" were covered mainly with fir and beech, but since the time of Henry von Cotta, the king of spruce and "father of conservative forestry," we find that these same areas are now almost completely covered with spruce. The demand for tan bark introduced the coppice system of handling oak. The substitution of chemical tannage for vegetable tannage has reduced the demand, and hence the oak coppice forests are rapidly disappearing. In many places beech and oak on account of their long rotations are being replaced by other species. A great many of the German forests are in a transition stage, which is gradual and cumulative in favor of the conifers. The present participation in the forest structure of the coniferous and broad-leaved species expressed in per cent is 67.5 and 32.5, respectively. The hardwoods before the advent of forestry had a higher percentage than they have today.

Of less magnitude than this rearrangement of the indigenous species, but of as vital significance, has been the introduction of exotic species especially from America and Japan. The main causes that actuated the introduction of foreign species were the fear of a fuel famine, commercial enterprise, aesthetic inclinations, silvicultural experimentation, and the limited number of native species of commercial importance. The first American tree introduced into Germany was the eastern Arborvitae in 1566. This was followed by the black locust in 1601, the bald cypress in 1640, the tulip tree or yellow poplar in 1663, the red cedar in 1664, the balsam fir in 1697, the white spruce and black spruce in 1700, and the white pine in 1705. The importation has continued, and

BLACK LOCUST TREES

Six specimens of black locust 18 inches in diameter. Trees to the right are European larch. They are located near the old castle at Herrenchiemsee, Bavaria, Germany.

at the present time practically every species native to America can be found somewhere in Germany. Some of the species that were introduced early have developed such excellent records that they are now regarded as naturalized members of the German forests. A few species are eligible for citizenship at the present time, while many other species, particularly those from western North America, have been introduced so recently that judgment with reference to their qualification for citizenship must be deferred until more complete data are at hand.

The seed of black locust was first sent to Europe in 1601. This tree was among the first plants carried to Europe, and has since been propagated so extensively that it is now regarded as naturalized in every part of the empire except the northeast. The fear of a fuel famine, about 1790, prompted the Hessian soldiers to make extensive importations of this species. They regarded it as the savior of the nation. The importation decreased, however, as the fear of the fuel famine subsided and as the value of the native beech became more fully known, largely through the efforts of George L. Hartig. At present one usually finds this tree in small open plantations upon poor sites, on the banks of railroad cuts where it acts as an excellent soil binder, and along avenues where it usually has been decapitated with the pruning shears until but a vestige of life apparently seems to remain. Black locust has passed its high-water mark in Germany, but has by no means fallen into disrepute. It is still planted as a lawn, park and street tree, and in the forests upon very poor and sterile sites. It seems to be freer from insect pests and fungal diseases in Germany than in America.

YELLOW POPLAR TREE

Twenty inches in diameter and located in the old castle yard at Herrenchiemsee, Bavaria, Germany. The trees to the left are black locust.

The red oak was introduced into Europe as early as 1740. It has at present the widest distribution in Germany of any American hardwood tree of commercial importance. In the state of Baden alone in 1909 about 436 acres were stocked with this species, ranging in age from one to eighty-two years. The younger plantations, which cover by far the larger area, show that this species grows very rapidly, suffers very much from the ravages of rabbits, and prefers fresh deep humose loam soil. In a young plantation of this species near Darmstadt 90 per cent of the specimens were peeled by rabbits, while other species mixed with it, including the European oaks, remained untouched. A stand forty-two years old had an average height of 57 feet, an average diameter of 5 inches, and contained 46 2/3 cords of wood per acre, thus showing an average annual growth of more than one cord per acre. Thinnings taken from this stand at the age of forty years brought $6.12 per cord. One of the oldest and most interesting stands of red oak in the state of Baden, covering about 15 acres, is growing near the town of Rothenfels. It is a rather open stand averaging about 105 trees per acre and is now (1915) eighty-eight years old. The trees have an average height of 88 feet and an average diameter of 17 inches.

The rapid growth of the red oak is one of its most commendable attributes. German records show that it has grown 8 inches in one year, 18 feet in ten years, 36 feet in twenty years, 54 feet in fifty years, and that after the fiftieth year the rate of height growth decreases. It is also regarded as more attractive ornamentally than the native European oaks on account of its smooth bark, straight branches, broad symmetrical crown, and the beautiful autumnal coloration of its leaves. Most of the German foresters who have plantations or stands of it commend it very highly. They think that it will play an even more important rôle in the future than it has in

NATURAL SEED REGENERATION OF WHITE PINE, TRIPPSTADT, GERMANY

Early or open and incomplete stage of regeneration.

the past. Their opinions are based upon the results of experimental plantations extending over almost a century, and in particular upon those established during the past thirty years.

The cottonwood was introduced into Europe in 1772. It is now planted extensively in the inundation district of the Rhine, especially in the vicinity of the city of Karlsruhe. It is one of the most rapid-growing species in Germany. According to Hartig, it may attain a height of 47 to 53 feet in twelve years, and 72 feet in forty years. Near Karlsruhe, in thirty-one years one specimen attained a height of 102 feet, a diameter of 22 inches and contained more than one-half a cord of wood. Other single specimens in forty to fifty years have yielded over a cord of wood. The German foresters usually set out one-year-old plants raised from cuttings. Lately, however, they have started to raise some of the plants from seeds. This tree on account of its rapid growth, its suitability for pulpwood, and its natural wide distribution in the eastearn and middle United States, should play an important rôle in the future forests of eastern North America.

WHITE PINE AND DOUGLAS FIR

Ebersberger Park Forest, Germany

Three specimens are white pine. The fence protects the plantation from deer and rabbits. The plantation is 12 years old and the largest Douglas fir is 28 feet in height. Douglas fir surpasses white pine in height growth.

The tulip tree, also known as the yellow poplar, was introduced into Europe in 1663. Most of the older specimens are found in parks, gardens, and about castles. It is not hardy in the extreme northern part of Germany nor the high mountainous region in the southern part. According to recent German experiments it can be established best if set out in spring just after it has started to put forth its new shoots. This necessitates a careful handling of the plants. In the municipal forest of Heidelberg is a young plantation covering 1½ acres and containing about 3,500 specimens. Heidelberg is located in one of the mildest regions of Germany, and, as should be expected, the plantation is in a very thrifty condition.

Among the other American hardwoods which have been introduced rather extensively may be mentioned the black walnut, wild black cherry, and the shellbark hickory. In addition to these species one often meets experimental plantations or isolated groups of butternut, sugar maple, white ash, black birch, and yellow birch. Many other species have been introduced which will never be used for other than ornamental purposes.

White pine, the former nucleus of the American lumber industry, was introduced into England in 1705, and shortly afterward into Germany. It was the first exotic coniferous species naturalized into Germany and Austria-Hungary. No native European conifer surpasses it in height and volume growth. In ten years it may attain a height of 10 to 15 feet, in twenty years 26 to 30 feet, in forty years 53 to 60 feet, in eighty years 92 to 95 feet, and in one hundred years 105 to 110 feet. The largest white pine trees in Germany have reached a height of 130 to 135 feet and a diameter of 5 feet.

As early as 1794 a Hessian hunting master, the forester of his day, brought some white pine seeds with him from America, with which he planted about 15 acres of land near Trippstadt, in Rhenish Bavaria. This stand has now passed the century mark and contains specimens 25 to 35 inches in diameter breast high. All the seeds which these trees produced until 1893 were collected for commercial purposes. Since 1893 no seeds have been collected because the seed-collecting business became less lucrative and the forester in charge wished to experiment with natural seed regeneration of white pine. For the past twenty-two years nature's agents have disseminated the seeds of these pines with the result that the oldest regeneration is now closed or complete while the younger regeneration is still open or incomplete, as shown in accompanying illustrations. The natural regeneration was, however, assisted by a superficial working of the soil, and by planting open or fail spots. Extended incomplete regeneration cannot be tolerated where soil prices are high. Some of the older specimens of this stand have been cut and marketed. The prices obtained per 1000 board feet in the log in the forest varies with the diameter. The subjoined schedule will give the prices of white pine and a few other coniferous species:

	Diameter in inches outside bark butt end of log.				
	24-inch	*20-inch*	*14-inch*	*10-inch*	*6-inch*
White pine per M..	$49.00	$37.00	$30.00	$21.50	$12.50
Scotch pine " " ..	26.00	23.00	22.00	18.00	14.00
Larch..... " " ..	30.50	27.00	26.00	21.50	14.00
Spruce..... " " ..	.....	25.00	23.00	20.00	16.00
Fir..... " " ..	.....	27.00	22.00	19.00	14.00

An excellent stand of white pine is also found in the municipal forest of Frankfort located near Isenburg. In 1855 white pine seedlings two years old were planted with alternating rows of oak. The oak was entirely suppressed by the rapid-growing white pine. The fail-rows of oak were filled in with Norway spruce, but it also proved a failure owing to the strong handicap of the white pine. The result is a pure stand of white pine with rather wide spacing. In 1911 this stand had 295 trees per acre averaging 80 feet in height and 12.5 inches in diameter. The average annual growth up to 1911 was 2 cords per acre.

In the municipal forest belonging to the city of Heidelberg, white pine covers an area of over 140 acres, aggregating about 150,000 specimens, which vary in age from two to sixty-five years. Among these 140 acres are some experimental plots. One was started in 1888 in which 2,750 two-year-old white pine seedlings were planted per acre at an expense of $10.50. In 1908 at the age of twenty-two years, they had an average height of 26.5 feet, and a volume of 53 cords per acre. This shows an average annual increment of 2.4 cords per acre. The average annual increment between 1903–1908 was 3.8 cords per acre.

The white pine can be found in pure and in mixed stands in Germany. The lessons to be learned therefrom should be of great value to the American forester who is at present planting this species on a gigantic scale. The advantages are in favor of mixed stands which show clearer boles, and yield a better quality of wood. Destructive organisms, of which the white pine has many, are also disseminated more readily in pure stands than in mixed stands. It can also be seen from the schedule of prices given above that the early thinnings of white pine have little value, at least less than any of the other coniferous species, and certainly less than most hardwoods. It seems advisable to recommend the establishment of mixed stands in which white pine should be the major species destined to produce quality, while the other species should be regarded as minor and temporary, and destined to produce material which can be removed in early thinnings and sold at a fair price, thus offsetting the initial constructive expense of the plantation.

Douglas fir was introduced into Europe in 1827. This was over a hundred years later than the white pine. In this relatively short period it has shown itself to be the most valuable exotic species. It is daily growing in favor with the German foresters. In Prussia alone over 350 acres were planted with it prior to 1911, not to mention the large acreage that has been planted in Bavaria, Hesse, and Saxony. It is found in pure and mixed stands. Some of the plantations show alternating rows of it and some other species, such as white pine, Norway spruce, and European larch. In almost every case the Douglas fir far surpasses the other species in height growth. Data from German nurseries and plantations show that it may reach a height of 4 inches in one year, 8 inches in two years, 46 feet in fifteen years, 56 feet in eighteen years, and 83 feet in fifty-three years. It is relatively free from enemies, but the deer feeds upon it rather freely, and in some places the foresters report that it suffers from snow break and frost. In youth the plantations are usually surrounded by a fence in order to keep out the larger destructive animals. The terminal shoots of small plants are often covered with tar to prevent the deer from eating or injuring the terminal bud. Frost may do considerable damage to seedlings and transplants but seldom damages larger specimens. It recovers very readily from damage on account of its numerous adventitious buds, and in this respect surpasses most other coniferous species. Plantations are usually established by using two to four year old transplants, and spacing the plants 5×5 or 6×6 feet.

In the municipal forest of Heidelberg is an experimental plot of Douglas fir with the following data accord-

EUROPEAN LARCH AND WHITE PINE

Plantation 20 years old located in the Ebersberger Park Forest, Bavaria, Germany. This forest contains 19,209 acres and is the largest solid forest area in Germany.

ing to Oberförster Krutina: The experimental plot was established in 1887 by planting three-year-old Douglas fir and two-year-old Norway spruce at a distance of four feet. The planting cost $4.56 per acre. In 1903 the stand consisted of 34 cords of Douglas fir and 7 cords of spruce. In 1908 this same stand consisted of 43 cords of Douglas fir and 6¾ cords of spruce. The average annual increment for the five years from 1903–1908 was 2.38 cords. The height of the Douglas fir and spruce in 1908 was 45 and 32 feet, respectively.

WHITE PINE DURING THINNING. MUNICIPAL FOREST, FRANKFORT, GERMANY

First heavy thinning in this 58-year-old stand. About 25 per cent of the volume of the stand was removed. Light thinnings were made at an earlier date.

The Sitka spruce is the only exotic species of spruce receiving forestal consideration in Germany at present. It was introduced into Europe as late as 1831, or about one hundred and twenty-five years after the white and the black spruce. Along the Rhine, in lowland and even in extremely wet areas, it seems to thrive. Upon fresh loam soil it has made a height growth of 9 feet in five years, and 11.5 feet in eleven years. It thrives upon areas where the native European species simply exists, and surpasses the latter in both height and volume growth. It suffers more from frost than the native European species, and is more subject to damage by browsing animals than the Colorado blue spruce. In 1909 the forests of the state of Baden alone contained 70 acres of Sitka spruce.

In addition to the white pine, numerous other American species of pine have been introduced into Germany, and can be seen in gardens, groves, and plantations. The species that is receiving the greatest consideration at the present time is the Jack pine, due to its ability to grow on very dry and sterile soil. It began to be introduced on a large scale after 1890, in which year Professor Mayr brought it to light. In the vicinity of Eberstadt in the state of Hesse are large parallel plantations of Jack pine and Scotch pine. The former grows more rapidly and straighter, and seems less sensitive to snow break. More than a half million trees of this species have already been planted in the state of Bavaria. A single firm distributed more than six million plants throughout Germany in 1906. Just as Jack pine is on the rise, so pitch pine is on the wane. Most of the stands of the latter species were established with the belief that it yielded the pitch of commerce. About twenty-five years ago the mistake became fully known and since then it has been receiving little consideration. It is said to suffer considerably from cold, late and early frosts, snow, and wind. Many of the existing stands are being removed rapidly to make place for more valuable and more promising species.

GIANT ARBORVITAE AND INCENSE CEDAR

In the park forest belonging to the Count von Berkheim, Weinheim, Germany.

The Big Tree, also known as Sequoia, from California, is common in parks and is occasionally found in

small stands. It was discovered in California in 1850 and three years later it was introduced into Germany. In the park forest at Weinheim, Germany, belonging to the Count von Berkheim, is an excellent stand of this tree in mixture with fir. This stand is now (1915) fifty years old. In 1911 the Sequoia had an average height of 55 feet and an average diameter of 14 inches. A careful count showed 64 Sequoias and 350 firs to the acre. The firs are of the same age, but have only an average diameter of 7 inches. The Sequoia prefers deep, fresh soil, mild climate and high atmospheric moisture. This park forest of Count von Berkheim covers approximately 91 acres and contains about 100 different species, most of which are exotics. Among the exotics are 30 species of American conifers and 9 American board-leaved species.

Germany has been importing American forest trees for three hundred and fifty years, with the result that we find there today the oldest and best experimental plantations of these species in the world. It is difficult to travel far in Germany without seeing some American trees. They are not only found in the forest, but are common in private and public parks and gardens, on castle grounds, and along streets. Almost every American tree can be found somewhere in Germany. It may, however, be well to remember that while the introduction into Germany of American trees has been going on for a long time and on a large scale, yet their present aggregate acreage is but a very small percentage of the total area of the German forest.

NATIONAL FORESTS TAKE IN $2,500,000

THE National Forests turned into the United States Treasury during the fiscal year ended June 30, 1915, nearly $2,500,000, an increase of more than $40,000 over the receipts of the previous year, according to a statement just issued by the Forest Service. The timber sales, which amounted to $1,164,000, yielded on account of the depressed condition of the lumber industry about $79,000 less than those of the previous fiscal year, but the gain was made possible by larger revenues from other sources. The grazing receipts, which totaled $1,125,000, increased $127,000 over last year, and the water-power receipts, which amounted to not quite $90,000, showed an increase of nearly $42,000.

The demoralization of the turpentine industry on account of the war's curtailment of the naval stores market caused the receipts from the sale of turpentining privileges on the National Forests to drop to about $9,000, as against nearly $15,000 last year. The sale of special use permits, under which all sorts of enterprises, from apiaries to whaling stations, are operated on the forests, yielded nearly $78,000, an increase of $9,000 over last year. There was a decrease of nearly $37,000 in the revenue derived by the settlement of trespass cases in which Government timber had been cut without intent to defraud, the revenue from this source being only a little more than $3,000. More than $7,000, however, was collected from other timber trespass cases. Grazing trespass cases yielded nearly $6,000, an increase of about $1,000; occupancy trespass cases, which occurred in only one of the seven forest districts, turned in something less than $250; about $60 was derived from turpentine trespass cases, and $660 from fire trespass cases, the latter being more than $7,000 less than the amount collected in the previous fiscal year for damage to Government property through fires carelessly or wilfully started in or near National Forests.

CHUGACH FOREST REDUCED

THE area of the Chugach National Forest, Alaska, which is to be crossed by the railroad that the Government is building from Seward to Fairbanks, is reduced nearly one-half by a proclamation signed by President Wilson, returning approximately 5,802,000 acres to the public domain. This action follows classification of the land by the Forest Service, showing that the areas involved are not of high enough timber value to warrant Government protection, and means the largest elimination of National Forest land ever made by a single Presidential proclamation.

The boundaries of the forest, as redrawn by the President's proclamation, now contain approximately 5,818,000 acres, supporting about 8 billion feet of merchantable timber. On the area thrown out of the forest there is in the aggregate a large amount of timber, but it is so sparse and scattered as to be of little or no commercial value. The land remaining within the forest, however, contains the largest and most accessible supply of timber for the development of the great mineral fields to the north of Bering River, and is the region in which the Alaskan Engineering Commission has been authorized to cut 85 million feet of timber for use in constructing the Government's new railroad. On account of the time required for cutting and seasoning construction timbers, the Commission has had to purchase some lumber from Washington and Oregon, but as cutting has already commenced on the Chugach, it is expected that the Alaskan timber will soon be serving the needs of the railroad builders.

The lands eliminated by the proclamation are in three large tracts; one along the entire southerly slope of the Chugach Mountains, the second lying northeast of Seward, between Resurrection Bay and Kings Bay, and the third, northwest of the Kenai Mountains in the region around Tustamena and Skilak Lakes. In addition, the towns of Hope, Sunrise, Kenai, and Ninilchek are eliminated.

The Problem of Forest Conservation

By W. B. Greeley, Director of the American Forestry Association

THE important question about forest conservation now is: Will it break down in the face of concrete business necessities? Much has been done to put the public forests upon sound footing. Marked progress has been made in the development of State forest activities and in bringing about effective cooperation of many different agencies for preventing forest fires. But the critical problem of the 80 per cent of private timber in the United States has scarcely been touched. We can neither "preach, print, pray, nor ballot" the owner of timberland into the practice of forestry when it does not pay.

Forest conservation must come to grips with this problem sooner or later. Its first task is to assemble the facts and look them squarely in the face—how far the status of wood has changed from a necessity to a competitor for a place in the market, what it costs not only to grow wood but to hold and protect merchantable timber which cannot be marketed for many years, and what readjustments of our economic conceptions may be necessary to permit the thrifty use and perpetuation of the timber resources of the country. The business difficulties and needs of the forest-using industries must be understood. Means must be found whereby the handling of their resources can be adapted to the larger, permanent interests of the country; but they must be sought through mutual recognition, by the public and the forest-using industries, of the economic well-being of each other and, if need be, by mutual sacrifices. The first thing to be done is to get the situation clearly understood by everyone.

W. B. GREELEY, WASHINGTON, D. C.
Director of the American Forestry Association.

To this task forest conservation should address itself and prove its right to be written down, not as a sporadic outburst of enthusiasm, but a sustained effort to make the most of national resources.

Tree Planting Along the Lincoln Highway

By Grace Roper Nevitt

ONE of the most extensive enterprises in roadside planting ever undertaken is that of the Lincoln Highway which extends from ocean to ocean, a distance of 3,400 miles. The work is being done under the direction of the General Federation of Women's Clubs. The planting is to be individual and each state section of the highway is under the direction of the conservation chairman of its own women's clubs. The organization from New York to California is complete and in many of the states, the trees, shrubs and flowers to be planted have been selected. In New York State, the plan for the "Sunrise Entrance" of the Highway in-

cludes the planting of white oak, reminiscent of Lincoln's career. With it will be combined Norway maples, hemlocks and white birches.

Masses of American laurel have been selected by the New Jersey women as decorative for the highway as it enters cities and towns or passes historic spots and fruit trees will be extensively planted throughout the state. The natural forests along the way, with laurels, hardy vines and perennials, have been adopted for Pennsylvania in an attempt to preserve and accentuate the native vegetation, presenting to the traveler a beautiful wild garden. Again in Ohio the wild garden effect will be used. Variety will be the aim of Indiana, the occidental plane tree, or sycamore indigenous to that state, elms, hardwood maples, golden glow and roses all figure widely in the plan. A "Lincoln motif" in plants and trees illustrative of certain of Lincoln's characteristics has been arranged in Illinois. Among the trees included in the arrangement are white oaks, to typify the national appeal of Lincoln's character, as it has the widest range of all trees, the red cedar, an evergreen, symbolizing the permanence of his fame, and flowering dogwood a reminder of the rail splitting days of the former President, since the latter shrub was prized by the pioneers for the making of wedges. In Iowa, Illinois and Indiana, it is noted that the prairie rose will mark the approach to cities, towns and spots of historic interest. The Kentucky coffee tree recalls the state of Lincoln's birth, while the wild grape, the silver bell tree, and the June-berry signify other sides of his character in the poetic conception outlined by the women's clubs.

West of the Mississippi River the highway will be bordered much of the distance by cottonwood trees. In Wyoming, the native cottonwood, quaking aspen, box elder and the old standbys in which are numbered pines and cedars find a place. Segra lilies, the state flower of Utah, the pines of the hills, and cottonwoods have been chosen for those sections of the road where vegetation will flourish in Utah. Unusual difficulties are presented to the women in the state of Nevada. The road stretches 350 miles, often through desert where for 40 or 50 miles there is no water and no possible way of irrigating. The tree planting committee of the state has expressed the expectation of securing assistance from the forestry service and from the State University. Cedars, pines, junipers are the state's native trees and can be employed along the rivers and in the mountain districts. A long lane bordered with California poppies, of golden hue, blue lupines, and the many vari-colored flowers of the California hillsides combined with pepper trees in abundance and other native trees promises an ending to the Lincoln Highway unexcelled in its attractiveness.

The planting on the Lincoln Highway itself, will be but a small part of the finished plan, for all the school yards along the route are to be beautified, and many inquiries have come to the planting committee in charge from the Southern States, which it is expected will result in road planting throughout the South with a possibility of new roads being built. In Georgia, the state Society of the Daughters of the Confederacy have already announced plans for a "Jefferson Davis Highway" which will also reach from ocean to ocean beginning at the Potomac and extending to the Rio Grande.

PROTECTING REDWOODS

FOREST owners of California are taking an active interest in effective and economical protection of the forests against fire, as is shown by the fact that three local forest protective associations have been organized in Mendocino County.

These three associations will protect over one-half million acres of redwood forests by cooperation among the owners.

These, with the Redwood Fire and Protective Association, which was organized four years ago, will place practically all of the redwood forests of that county under systematic protection. These local associations will cooperate with the California Forest Protective Association, which is actively engaged in organizing such associations throughout the timbered counties of the State, and it is expected that practically all the privately owned timberland will be under such cooperative protection against forest fires before the dry season of 1915.

In Santa Cruz County the forest and home protective association was organized early in the season and has been able to almost entirely prevent forest fires in that county. This is an especially good record because the most extensive and destructive forest fires in the State during 1913 were in Santa Cruz County. This association is also cooperating with the California Forest Protective Association.

Wherever the privately owned timberlands are adjacent to the National Forests, many of the owners cooperate with the Federal Forest Service for protection against fire and this cooperative work is being rapidly extended as the benefits are realized by both the Federal foresters and the owners.

Without doubt this cooperative system can be carried on more effectively and economically through local forest protective associations, especially as they will be able to secure the participation of small owners.

While this cooperation between the Federal Forest Service and local forest protective associations, composed of private owners, will do much to preserve the forests of merchantable timber, there are vast areas of cover growth which are not protected.

This can be accomplished only by a law providing for cooperation on the part of the State with the Federal Forest Service and private owners of timberland, which would effectively protect from fire all the merchantable timber and all the cover growth on the watersheds.

A law providing for such cooperation on the part of the State was introduced in the Legislature of 1913 by the State Conservation Commission. It was known as Assembly Bill 643, was approved by Gifford Pinchot, Federal Forester Henry S. Graves and other authorities on forest protection, and passed both the Senate and Assembly. It was opposed by the State Forester, however, and was not signed by Gov. Johnson.

Indiana's Forestry Home

By Burr N. Prentice

THE Indiana State Board of Forestry is planning a large forestry exhibit for the new building at the State Fair at Indianapolis, September 6 to 11. The board has now at its disposal a building well suited for its purpose. It is of the bungalow type, 24 by 36 feet. It will be occupied by an extensive exhibit of the forests of the State and their products. The results of the work of the State Board at the Indiana forest reservation are to be graphically shown. A complete dendrological collection of the timber trees of Indiana is to occupy another section; statistics and charts outlining the status of the wood-working industries of the State are to be given a third section, while a fourth large section is to be occupied by the lumbering, utilization and timber preservation interests of the State. It is desired that no phase of the situation be omitted, to the end that this new home of the State Board during the fair may be a place of such interest to all lumbermen and those in any way interested in forestry that they will make it their headquarters while on the grounds.

A STATE FORESTRY BUILDING

Erected by the Indiana State Board of Forestry for exhibition purposes at the State Fair, Indianapolis, Indiana. State Forester E. A. Gladden at the entrance.

For several years the Board has been carrying on a series of experiments at the State Forest Reservation, near Henryville, Ind., to determine important factors that enter into the maintenance of Indiana woodlots. It is said that in Germany negative information is considered of as much value as that of a positive nature. The proof that certain species of trees are unfit for soil and climatic conditions existing in Indiana should be as valuable to woodlot owners as the proof that certain others are particularly adapted to that climate. The Board finds that some valuable species of trees make a rapid and financially successful growth in the State's woodlots, while many other less valuable species, which unfortunately are often permitted to take up space in the woodlot, cannot be made to show a profit.

The reservation, which covers an area of some 2,000 acres, is located on some of the poorest soil in Indiana. Experiments which have been carried on there are of especial value, because this is the particular class of soil least suited for agriculture. The State Board has kept accurate growth records of the demonstration plots and reforestation work at the reservation. The large variety in the species under experimentation has brought to notice many factors of growth which are of vital interest to the woodlot owner.

All this material clearly and vividly shown, together with actual photographs of plantations and under plantings at the reservation, will form a part of the exhibit.

The Board announces a special feature of interest to the friends of closer wood utilization throughout the central hardwood region. This is the appearance of Mr. E. A. Sterling as one of the list of speakers. He is a well-known authority on utilization subjects and a live factor in the combat between wood and its substitutes. He will represent the new Trade Extension department of the National Lumber Manufacturers' Association of Chicago.

PHILIPPINE LUMBER FOR CHINA

The Director of the Philippine Bureau of Forestry, who has recently returned from a trip to China in the interests of Philippine lumber, reports that there is a market in China for all the lumber produced in the islands if the proper connections can be made between the producer and consumer. The Chinese dealers want a guarantee of a constant supply. They are not willing to accept one consignment, but demand that they be assured of continuous supply, even though it be small. An American formerly in the service of the Philippine Government, now in business in Shanghai, reports that there is a demand there for Philippine lumber, but there is not a constant supply, and the purchaser is never sure of getting enough of the same class to complete his particular job.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

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TIMELY SUGGESTIONS FOR THE PRUNER OF ORNAMENTAL AND SHADE TREES

SEPTEMBER is the month when pruning of ornamental and shade trees can be done to the greatest advantage. The dead branches can be distinguished from the live ones very readily at this season, the general contour of the tree can be judged with greater ease and climbing into the branches can be done more safely than on a cold winter day. The following hints will help the pruner in preventing injury to himself or others and in accomplishing his work in accordance with correct pruning principles.

HINTS ON CLIMBING

Set out the danger signs before commencing heavy pruning work.

Examine the condition of your ladder and tie its upper end to the tree before starting out.

Be sure of the strength of your branch before tying an extension ladder to it.

Do not slant the extension ladder too much.

Always watch the upper end of your ladder. Always have another man hold your ladder when you go up to tie it or when you come down after untying it.

Never remain in a tree or on a ladder while a limb is being pulled off or lowered.

Examine all rope before using it on heavy work.

In removing a heavy branch use two ropes, one to guide, the other to lower the branch.

Use caution where high power wires are running through or alongside of trees, as the insulation may be worn off and make work very dangerous, especially in wet weather.

Always consult your foreman before taking up any work where risk is involved.

Before starting out on a tree, judge its general condition. The trunk of the tree that shows age, disease or wood-destroying insects generally has its branches in an equally unhealthy condition. Greater precautions should, therefore, be taken with a tree in this condition than with a young vigorous tree.

The different kinds of wood differ naturally in their strength and pliability. The soft and brash woods need greater precaution than the strong and pliable ones. All the poplars, the ailanthus, the silver maple, the chestnut, the catalpa and willow are either too soft or too brittle to depend on without special care. The elm, hickory and oak have strong flexible woods and are, therefore, safer than any other. The red oak is weaker than the other oaks. The sycamore and beech have a tough cross-grained wood and are, therefore, fairly strong. The linden has a soft wood, while the ash and the gum, though strong and flexible, are apt to split.

BADLY PRUNED TREE

In order to make room for the overhead wires this tree was cut as shown in the photograph and its unsightly and unnatural appearance is at once an evidence that the work was improperly done.

Look out for the limb that shows fungous growths. Every fungus sends out a great many fibers into the main body of the limb, which draw out its sap. The interior of the branch then loses all strength and becomes like a powder. Outside appearances sometimes do not show the interior condition, but one can be sure that every time he sees a fungus popping out there is trouble behind it, and the limb is not altogether safe.

When the limb is full of holes or knots, it generally indicates that borers have been working all kinds of galleries through it, making it unsafe. The silver maple and the sycamore maple in this locality are especially full of borers which in many cases work on the underside

of the branch so that the man in the tree looking down cannot see its dangerous condition.

A dead limb with bark falling off indicates that it died at least three months before, and is, therefore, less safe than one with its bark tightly adhering to it.

Branches are more apt to snap on a frosty day when they are covered with an icy coating than on a summer day.

A rainy or drizzly day causes the branches of a tree to be slippery, and greater precautions are then necessary.

HINTS ON PRUNING

Always use a pole saw and pole shears on the tips of long branches, and use the pole hook in removing dead branches of the ailanthus and other brittle trees where it would be too dangerous to reach them otherwise.

Do not "Head Back" or cut off the top of a tree except where the tree is old and failing, and then under special instructions.

Be as sparing and as judicious in your pruning as possible, and do not raise the branches so high as to make the tree look like a telegraph pole.

Commence pruning the tree from the top and finish at the bottom.

Make every cut as close and parallel to the trunk as possible.

Your saw must be well set and sharp in order to make the cut perfectly smooth.

Leave no stubs, dead and dying wood, or fungus-covered branches behind you.

Do not fail to cover every wound with coal tar, not allowing it to needlessly run down the trunk.

Do not remove several large branches on one tree at a time. They must be removed gradually, the work extending over several seasons.

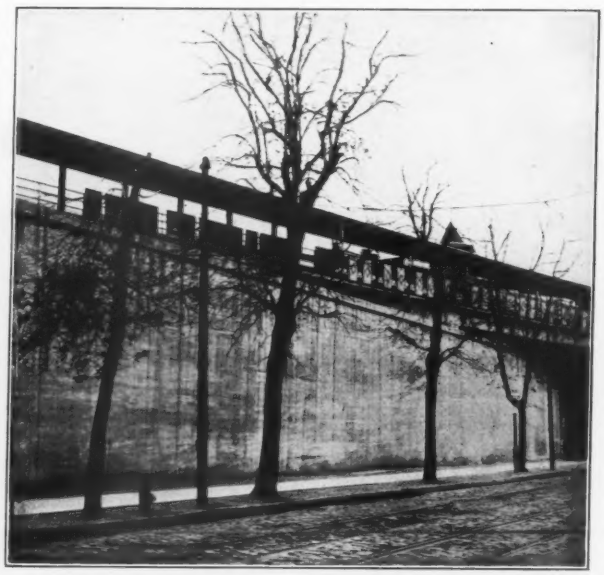
Prevent tearing the bark off the trunk in removing large limbs by first making an "undercut."

Make the cuts on a slant. Some trees, like the elm, sycamore, linden and willow will stand the process of heading back more than others, and the poplar is a tree that must be cut back every few years to keep its crown from becoming too tall and unsafe.

When you shorten a branch leave a few twigs at the end in order to draw the sap to the freshly cut wound and thus enable the growing layer under the bark to heal it over.

In trimming small branches or shoots, the cut must be made just above a bud.

When several branches come out from the trunk in a whorl, they should not all be cut away at the same time lest the tree be girdled. This arrangement of branches occurs most frequently in the coniferous trees.



HOW NOT TO PRUNE TREES

In the accompanying article is much excellent advice on how to prune trees and if this is carefully followed such results as are seen in this photograph may be avoided.

MT. VERNON, N. Y., AND ITS SHADE TREES

Mt. Vernon, N. Y., and its authorities deserve congratulation upon the organization of a permanent Shade Tree Commission and a municipal office and field force to care for its shade trees and work up a plan for present and future planting.

Mt. Vernon, a city of under 40,000, is one of the smaller communities supporting such a department, but shows the characteristic progressiveness of that city, and is indicative of the growing interest throughout the country in having the shade trees properly cared for. A wealth of trees graces the streets of Mt. Vernon, most of which were planted thirty-five to forty-five years ago. The maples comprise the majority while the elms, lindens, poplars and horse chestnuts are very abundant, the rest being well distributed among some twenty-five species. The tree conditions are those usually found in all cities where systematic care has been unknown. Some of the oldest trees are showing signs of decay; and faulty spacing of many of the trees is the natural result of haphazard individual planting. The insect damage this year has been remarkably slight, especially when compared with the heavy inroads made by the tussock moth and other insects in some of the eastern cities. The Shade Tree Commission has made an early start and by so doing will avoid that almost treeless period from which so many cities have suffered due to lack of proper foresight.

Many European cities are famous for their far-sighted policies and the size of improvement projects which they undertake; harbors, waterways, transportation facilities, parkways and boulevards are all planned in accurate detail long in advance of actual development and are always planned with the idea of benefiting the greatest number of people. The reason may be found in the ever-present attitude of sacrificing the individual for the good of the community. In this country it is usually the individual or corporation that prospers at the expense of the municipality. Playgrounds, parks and well shaded streets are of prime importance in adding to the comfort of any community, thus making the city more attractive to strangers and more appreciated by the residents.

The American city is, however, gradually realizing the vital need of caring for its citizens and of making life more enjoyable for them. It has recently awakened to the need of more trees and parks as factors in the city beautiful and city healthful, and has already done much along these lines. Every progressive city nowadays has a tree department or is considering the organization of one. Mt. Vernon is therefore very timely in its recent choice of a trained forester to head its tree work. Mr. A. Oakley Smith, a graduate of the Yale Forest School, who fills this office, has specialized in the care of ornamental and shade trees at the Yale School and has enhanced his experience under such men as Vitale, Munson-Whitaker and others.

IMPROPERLY PRUNED

Shade tree on a city's sidewalk as an example of how not to cut branches. Stubs are shown projecting from the trunk and limbs while the cutting should be close to the trunk or the limb.

TREES OF THE NATIONAL CAPITAL

Washington, D. C., now has 584.18 miles of shade trees, with an average of 352 trees to the mile, according to the annual report of Trueman Lanham, superintendent of trees and parkings, presented to the District Commissioners. The total number of trees is 103,135. During the last year 3,388 trees were planted and 2,596 removed, making an increase of 792 trees.

No other city in the world can compare with Washington in the mileage of oak planted trees, according to the report. There are 52,783 miles of them here on the streets, or 28.15 miles of streets have a double row of the oak trees. During the past year more sycamores were planted than any other variety. Trimming of trees was handicapped considerably during the twelve months by scarcity of funds. More than 55,000 trees were sprayed, a vigorous crusade having been waged against the tussock moth and other insects.

BUFFALO PROGRESSING

City Forester Filer of Buffalo writes: "Plenteous rains and absence of hot weather makes the 1915 summer and spring the best we have had in Buffalo for 10 years for trees. Last year at this time the trees looked pretty burned and tough, but today they are green and fresh and beautiful." That Buffalo will in the future be "a city of trees," Forester Filer has a corps of men now at work treating the young trees all over the city, restaking and readjusting wherever needed. The tree-trimming will continue until cold weather. Twelve spraying crews have completed war on the tussock moth and started out to destroy the cocoons. Because of the consistent crusades against the tussock moth in Buffalo the specie is becoming less and less each year.

BAYONNE, N. J., TREE WORK

Bayonne, N. J., has some beautiful shade trees worth preserving and should have many more planted. The following editorial in the *Bayonne Review* indicates the sentiments of the city's residents:

"The shade trees of Bayonne have been remarked by many visitors as its crowning beauty. They have been surprised at the verdant streets and the heavy foliage in a city that they had been led to believe was a collection of oil tanks and tall chimneys.

"That this beautiful feature of the city has been left untended and uncared for by any public authority has also been a source of surprise to many.

"The appointment of a city forester is not a useless job. It can be made a most important one and for Bayonne, can fill the place occupied by the shade tree commissions in other cities."

QUESTIONS AND ANSWERS

Q. Some one told me that the poplar tree is not a desirable tree to plant. Please give me a reason, if that be true.

A. F. L., *Indianapolis, Ind.*

A. For general planting the Carolina and all other poplars are not desirable. They are short-lived trees and their wood is so soft and brittle that they very readily break in windstorms. They grow too fast and generally become top-heavy and dangerous. Their finer rootlets penetrate the neighboring sewer and waterpipes and their larger roots upset the sidewalk. Their leaves drop earlier than the leaves of other species and the catkins of the female tree are quite a nuisance to pedestrians in the spring. The only reason for planting the poplar is where the local soil and atmospheric conditions are so poor that nothing else will grow as well or, in case of the Lombardy poplar, its use is justified for aesthetic effects. A screen of poplars is also very desirable at times.

Q. I would like to get literature which would be of use to me on a small place, about two acres, in Dutchess County, now practically bare, except for a few ash. This is the last slope of the hills south of Fishkill where I have thought I might develop a very small nursery probably of deciduous trees. But having no practical knowledge, only general interest, I do not know what books would be of the most service.

A. R. V. H., *Lake George, N. Y.*

A. For literature, see "Studies of Trees" by J. J. Levison, and "The Care of Trees" by Dr. B. E. Fernow,

both included in AMERICAN FORESTRY's "List of Books on Forestry." For specific instructions, kinds of plants, planting, etc., write to any of the tree nurseries which advertise in AMERICAN FORESTRY.

Q. What are the best trees to plant in front of my house in the city of New York?

A. de C., *New York City.*

A. The Oriental sycamore *(Platanus orientalis)* is undoubtedly the hardiest and generally best adapted to the unfavorable conditions of the average city street. It grows fairly rapidly, is ordinarily free from insects and disease and forms a symmetrical compact crown. The Norway maple (*Acer platanoides*) is the next best tree to plant and the Red oak, European small leaf linden and Gingko are still others that may be chosen. The species is, of course, an important consideration, but no tree will do well on the city street unless one provides from two to four cubic yards of good loam and plants the tree with great care.

Q. We have at our summer home at Mackinac Island, two beautiful maple trees, one hard maple and the other a soft maple. The soft maple, perhaps 50 or 60 years old, seems to be dying out. The leaves are turning yellow and some of the top branches are dead. We find many small holes drilled through the bark, and into the body of the tree, as clean as though a gimlet had been used. We have removed some of the bark, and find a coating of seemingly dead wood of a brownish color about an eighth of an inch thick. Cleaning this off, we find good, live wood underneath. We have removed the bark in several places and find the same condition exists in each case. Will you kindly advise what way we should proceed in the way of treatment to save this tree?

J. R. H., *Detroit, Michigan.*

A. From your description, it seems that the living tissue of the soft maple, situated immediately underneath the outer bark, has already been injured by an insect which has emerged some time ago. If this "coating of dead wood" binds the whole circumference of the tree, then it is doubtful whether anything can be done to save the tree. If parts of the tissue underneath the bark are still good and fresh, then you might resort to "heading in," which means cutting in the whole top of the tree heavily. A soft maple will stand the treatment. This should be done in September.

Q. What shall I do to combat the elm leaf beetle?

J. E. M., *Worcester, Mass.*

A. Spray with arsenate of lead during the latter part of May and gather the pupal at the base of the tree during the first ten days in August.

Q. What is the best guard for street trees?

A. M. P., *Reading, Pa.*

A. The most useful and cheapest guard is made of wire netting, ½ inch mesh and No. 16 or No. 17 gauge. It should be six feet high and should have a piece of hose on its upper end to prevent chafing.

Q. Can you tell me what causes maple leaves to turn reddish brown in midsummer, and if harmful to the trees?

M. L., *Poughkeepsie, N. Y.*

A. Maple leaves generally turn reddish brown in midsummer when the supply of water is cut off from the roots. Cultivation and watering will generally revive the trees.

Q. Can you tell me what to do for a large hickory tree which has good nuts, but few of which mature?

T. B. S., *Hackensack, N. J.*

A. The first thing suggesting itself in answer to your query about your hickory tree is that the frugality of mature nuts is due to an inherent quality of barrenness in the tree itself, something that is very hard to overcome but has in rare instances been corrected by topwork. It is necessary that this shall be done by a specialist in this line of work, and it is quite an expensive process. Would suggest that you write to Dr. Deming, Secretary of the Northern Nut Growers Association, Georgetown, Connecticut, for fuller information. It is possible that the condition might be helped by seeing that the ground about the tree is fertile and in good condition and that it has plenty of moisture, as the hickory demands more moisture than many other species.

Q. How shall I kill a grub in a maple tree?

MRS. M. M. L., *Columbus, Ohio.*

A. Inject carbon bisulphide into the burrow and clog the orifice immediately after injection with a bit of soap. The soap will prevent the deadly gas generated by the carbon bisulphide from coming out. The following day remove the soap and paint the wound with coal tar.

WORK FOR THE MONTH OF SEPTEMBER

1. Prune the shade and ornamental trees in the Fall before the leaves drop.

2. Collect and destroy the eggs of the tussock moth and cocoons and egg-masses of other insects.

3. Remove borers in fruit trees and look out for borers in other trees.

4. Mark with white paint all dead and hopelessly diseased trees which are to be cut down in winter. At this time one can see them better than in the winter time.

5. Visit the nurseries this month and select the plants required for planting in the Spring of 1916. At this time one can have a wider choice of material at absolutely staple prices. The plants may be left standing in the nursery for delivery in the spring.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

By Bristow Adams

HOW A TREE GROWS

THROUGHOUT its life a tree grows only at the tips of the twigs and at the tips of the rootlets. When any part except the very end of stem, or branch, or root is once formed, it keeps its same place and grows neither up nor down. Thus a nail driven into a tree trunk will always be the same height from the ground, no matter how old the tree may become. While the tree may push up higher or down deeper, its branches once formed remain in exactly the same position which they had when they first sprouted. Many persons suppose that the whole tree pushes up in height. Not many years ago there was a story current that a man had set his barn upon willow posts, and that the posts grew up in the air so that at the end of a few years he boarded in the lower part of the barn and had another story. This process continued indefinitely until he had a regular sky-scraper, and then converted it into a silo. While this story may have started as a joke, it was repeated in many newspapers and periodicals as an interesting fact. That it is not true is proved by the fact that "blazes" or axe-marks cut in the bark of trees by our earlier surveyors have remained in exactly the same position for hundreds of years, perhaps being grown over by the bark as the tree increased in girth.

THE PARTS OF A TREE

A tree is composed of three parts, the head or the crown, the trunk or bole, and the roots. Each one of these three parts is further divided into other parts; in the crown are branches which in turn form into branch-lets, and these into finer sprays or twigs which bear the leaves and fruit. Just as the branches are divisions of the bole or trunk, so the roots are divided into rootlets which are covered with root hairs.

Each of these parts is necessary and helps to carry on the tree's life. The roots have two purposes: First, they absorb the water which contains the tree food that comes out of the soil; and, second, they hold the tree in place by anchoring it firmly to the ground. Some trees, such as the maple, have wide-spreading roots that keep near the surface; others like the hickory develop a deep tap-root which goes almost straight down.

THE trunk or stem also has two duties to perform. It holds the branches up, and rises to a sufficient height so that it can bear these branches and leaves where they can get the sunlight. In the forests, the topmost branches of the tree extend farthest, reaching up and up to the sunlight. For this reason, the trees which grow in dense woods, closely surrounded by their neighbors, are usually straight, and tall, and free from side branches. The forest-grown tree is the one that is most useful to the lumberman because from it he can get long, straight boards and poles, without knots and cross grains, which are made by branches that grow out from the stem.

A tree which grows in the open can find its light on all sides, and it thus reaches out with limbs that extend along the trunk from the ground to the very top, getting the greatest amount of sunlight from all sides as well as from the top. These round, short, low-headed trees are of the kind which grow in open meadows; under them the cattle find grateful shade in summer.

The second duty of the trunk is to form, with the branches, the channels through which the food materials go from roots to leaves, and back again, through each growing part. In cross section, the trees shows on the outside a layer of bark which protects it from injuries. The bark is not alive and cannot stretch with the growth of the tree, so that it gradually cracks and breaks up into plates or ridges, but it is being constantly built up by new layers from the inside. The very thin layer next to the bark, known as the cambium, is the living, vital part of the trunk. It builds on its outside this layer of bark and, on its inside, a layer of wood around the trunk. Just inside this cambium layer is what is known as the sapwood, which is generally lighter in color than the middle part of the tree, or heartwood, and is made up of a number of rings of growth, one of which the tree puts on every year. Within this sapwood the sap moves up and down and this part of the tree is, like the cambium, a living portion of the growth. Inside the circle of the sapwood are other rings of heartwood to the very center. This heartwood portion no longer has life, but serves its purpose as a column of strength and support.

The leaves grow on the outermost portions of the tree, since they must be where they can receive the sunlight. It is for this reason that the trunk lifts the branches on high, and the branches hold the twigs far out, and the twigs divide into the finer sprays so as to spread the leaves and hold them well into the sunlight.

The cambium layer is a coat of growth over all parts of the tree, with its roots and branches. This cambium layer, with the aid of leaves and rootlets, manufactures a substance which goes to make up the wood of the tree, and about half of this wood substance comes from the air and the other half from the water and soil. The water and the soil dissolved within it are taken in through the roots, and the air is taken in through the leaves. The material from the roots is carried up through the larger roots, through the outer layers of the trunk, clear to the leaves, where the water is given off into the air. But the food parts are kept and mixed with the parts of the air which the tree uses; the two combined become the stuff of which the tree is made.

THE leaf is a factory. The green pulp in the leaf is part of the machinery, which is set in motion by the power of the sun. The finished product is largely starch. This starchy matter is stored in the sapwood to be used for the growth of next year's leaves, but since starch cannot be directly used by the plant in that form, it must be changed to sugar. Thus the leaves, also, are obliged to do double work and have to digest the food which they have manufactured for the tree's use. They change the starch to sugar and to other substances which form parts of the tree's diet.

The tree works very fast and finishes most of its task of growing by midsummer. The autumn leaf is one which has completed its work, and the green starch machinery has been withdrawn and is safely stored in the woody part of the tree. The leaf may then be gold or red, for it has in it only materials which the tree can no longer use. It is a mistake to think that the frost causes the brilliant colors of the foliage. These colors are caused by the natural old age of the leaves and the departure of the green material, for when the leaf takes on its brilliant color it is ready to depart from the tree. Its duty is done, and a thin layer grows between the stem and the twig to which it has been attached, and when this growth is finished the leaf drops of its own weight, aided, perhaps, by the autumn winds.

EVERY step in the growth of the tree is recorded in the twigs and in the trunk. Those who have learned to know the meaning of leaf scars can tell how old a branch is, and can tell the struggles through which that branch has passed. The layers of growth are also recorded within the trunk, and one can tell just how old a trunk or branch may be by counting these annual layers or rings. Most of the material in these rings is deposited in the spring or period of greatest growth activity. The spring part of the annual ring is therefore more porous and generally lighter in color than the summer portion. Some rings are wide and others are narrow, and the width of the rings and their formation show whether the tree has had good years or bad years. A very dry season will leave its mark on the tree in the shape of a narrow annual ring, because the tree could not make much growth without enough moisture. Even injuries are recorded, and a bad fire scar in one year may be followed in after years with narrow growth because the tree was poorly nourished on that side which was exposed to the fire. Such an accident is likely to make the tree grow twisted or crooked so that the trunk instead of being round will be oval in shape. Other trees, exposed to harsh winds, will not grow as rapidly on the exposed side as on the other, and these, too, may grow in distorted or lopsided forms. When one learns to look for such records the trees will tell their own stories.

A SUCCESSFUL TREE PLANTER

RICHARD JAMES DONOVAN, a lawyer of New York City, has just completed the planting of 430,000 pine trees at Pine Park, Franklin County, New York. Seventy thousand of these pine trees were planted this spring and the entire planting has been completed in three years. The work, which is known as under planting, is located about Pine Lake, Lily Pad Lake, Rainbow Lake and Clear Pond, in the townships of Franklin and Brighton in the Adirondack Mountains between Loon Lake and Lake Placid.

Mr. Donovan says: "The trees are thriving and the loss has not been more than 2 per cent of the entire planting. These trees were all purchased from the State Conservation Commission at prices ranging from $1.50 per thousand to $4.00 per thousand, depending upon the age of the tree. The cost of planting is only from $3.00 to $5.00 per acre and from 600 to 1,000 trees are planted. A good man will plant 1,000 seedling trees in a day."

He finds from experiences of tree planting that guides and all natives living in the vicinity have become intensely interested in the protection and care of newly planted forest from fires. There have been no fires in the vicinity since tree planting began and the burning of oil on the locomotives by the New York Central and Delaware & Hudson Railroads and the patrol which follows each train from station to station during the dry season, and the look-out signal stations established by the State on Loon Lake Mountain and St. Regis Mountain appear to give complete protection to the forests.

Mr. Donovan further says: "Tree planting is a splendid investment because it rapidly enhances the value of the land, makes it more salable and in a few years will develop a fine timber and lumber forest and adds to the scenery in that charming mountain and lake region and gives protection to the birds and wild game and improves the water sheds. It makes better shooting and fishing. Every owner of land and every native Adirondacker ought to become an enthusiastic tree planter. The interest that it stimulates and the outdoor life that it cultivates is a fine asset to people both for health as well as for financial gain. The Adirondacks, with its 1,800 lakes and numerous pure streams and lofty mountains, ought to become nature's greatest playground and health resort on the earth, and it will be if people plant trees and maintain the existing forest by protection from fires. Its healthful climate is unsurpassed. The Adirondack region is truly America's Killarney."

Wood Preserving Department

By E. A. Sterling

The Modern Application of Wood Preserving Methods—Various Treatments and the Use of Treated Woods

SINCE the September issue of the American Forestry gives special attention to yellow pine, it may be stated that this wood has been more extensively treated against decay than any other. In 1914 10,600,000 yellow pine railroad ties were treated out of a total of 44,000,000, the only wood used to a great extent being oak. For construction timbers of all kinds, particularly bridges, trestles, and marine work treated yellow pine leads the list with Douglas fir second.

New uses for treated yellow pine are being developed, with the result that the user gets better service and the producer is able to market the lower grades and utilize all parts of the tree more closely. It remains to extend a more general knowledge of the possibilities of wood preservation to the smaller consumers. Railroads and other large corporations are at least partially awake to the possibilities, but the home builder, the farmer and the head of small companies has not been educated, nor informed, as to what treated timber will do for him, nor where nor how it can be obtained. In fact it is difficult to make retail distribution of treated lumber at the present time because the user doesn't know what he wants, and the retail yard man doesn't carry it in stock, and the big treating plants and lumber manufacturing companies have not developed this class of trade. It is in keeping with the possibilities of yellow pine for treatment that the Southern Pine Association and some of the manufacturers are vigorously taking up the matter.

CLOSELY related to the preservative treatment of wood against decay by creosote or zinc chloride is the fireproofing of wood. Large timbers stand up well under a severe fire, and the character of contents rather than the building material determines the fire hazard. While sprinkler systems are considered the best protection in any type of building, the fact remains that fire retardants are desirable under certain conditions. Realizing this condition, the National Fire Protective Association has recently published an excellent report on "The Use of Wood in Building Construction," which contains results of experiments with various fire retardant materials, including shingle stains, paint, and various mineral salts. It is impossible to summarize this report other than it shows that there is very little difference in the inflammability of various kinds of untreated wood, and that ammonium salts and sodium borate gave more satisfactory results than other chemicals, and that paint is a fire retardent. Those interested in the subject can obtain further information or copies of the report by writing to the National Fire Protective Association, Boston, Mass.

CREOSOTED wood block pavements are rapidly becoming recognized as the most satisfactory of all street paving material. They are noiseless, durable, sanitary, and if properly treated and laid are distinctly economical. The failures in the past which have in some cases prejudiced cities against wood blocks have been corrected, so that there is no excuse now for the existence of any wood block pavement which doesn't meet all of the modern requirements of service. The improvements in the methods of treatment and laying are largely the result of organized activity by various associations representing either the lumber interests or wood preserving plants.

The latest and strongest organization to take up the matter is the Southern Pine Association of New Orleans. Their publications on Creosoted Wood Block Pavements show irrefutably through the statements of civil engineers, paving experts, street commissioners and citizens' leagues, backed further by the opinions of government experts, that creosoted wood block is the one ideal pavement. All interested in the subject should obtain the bulletins of this organization. Another factor leading towards greater efficiency in the handling of this whole subject is the cooperation recently arranged between the Southern Pine Association and organized manufacturers of creosoted wood block.

MUNICIPAL progress in creosoted wood block paving work is indicated by a few examples of recent activity in various cities. Memphis, Tenn., is to pave Main Street and part of Front Street for a total distance of 3,642 feet; Cincinnati has just finished putting down 11,000 square yards of creosoted pine block pavement. The blocks in the first case replace cobblestone and asphalt, and in the second, granite blocks. The city of Philadelphia in July awarded contracts for wood block paving on three streets, two of them carrying some of the heaviest traffic in the city. In New England at a recent outing of the Cambridge, Mass., Board of Trade a vote of the 300 members present showed 270 in favor of wood blocks. On the Pacific coast, where the use of wood blocks is not as thoroughly established as in the east, experimental sections are being laid in many of the cities. In Seattle a contract has been let for wood block pavement on Twelfth Avenue, and through the activity of the West Coast Lumber Manufacturers' Association and the local creosoting interests the efficiency of this form of pavement is being demonstrated. In Florida there is a growing realization that the local material, on which much of the prosperity of the state depends, is the best available for street and

road pavement. It follows, therefore, that creosoted longleaf pine blocks are being advocated and used, thereby stimulating local industries, and at the same time giving the best possible service.

EVERY progressive farmer has or needs a silo. This has been so evident and the developments so rapid that the prospective buyer is confused by the claims of silo manufacturers representing many materials. While brick, tile, cement and even galvanized iron have been used, unbiased opinions hold that the wooden silo is by far the best. To overcome any possible objections to wooden silos on account of decay or shrinkage the Acme Tie Co., of Reed City, Mich., has during the past year put on the market what is known as the "Acme Creosoted Stave Silos." The staves are given an empty cell rueping treatment of six pounds of coal tar creosote per cubic foot. They come out of the cylinders thoroughly impregnated, yet with no surface oil to contaminate the silage or make the erection work objectionable. The completed creosoted silo is rendered entirely immune from decay, checking and shrinking, and the necessity of repeated painting is removed since the creosote is permanent.

The question of whether the creosote will taint the silage is covered by statements and experiments by various agricultural colleges and individuals. Prof. F. M. White, of the University of Wisconsin, states that "Staves of any material should either be painted or creosoted. . . . If used on staves the staves should be soaked in the creosote rather than painted, although painting is of some value. There will be some odor of the creosote in the silage, but the cattle will soon become accustomed to the smell and no harmful effects follow." A practical farmer in Iowa states that "I have four silos, one is creosoted, have fed from them two years, and will positively say that the ensilage in the creosoted silo is as sweet and nice around the walls as in the others, no effect of the creosote whatever; have never tightened the hoops on the creosoted silo and it has been in use two years. I will recommend them highly." Another farmer who has used a creosoted silo for five years reports that, "The silage is not tainted by the creosote, at least not to any extent. The stock relish it, it seems to me."

An important point in connection with what is bound to be substantial developments in the use of creosoted silo staves is that a superficial treatment by painting or dipping does not give the same satisfactory results as pressure treatment by an empty cell process. In the former case there is much more likelihood of free surface oil and contamination.

Woodlot Values Worth Investigating

THE marketing of farm timber presents some of the same difficulties, but in an aggravated form, that the farmer meets in selling other crops, says a Forest Service contribution to the Year Book of the Department of Agriculture, just issued. The farmer finds it hard to get enough for his timber. Most farmers now sell their saw timber on the stump to a mill man, such sales ordinarily being made for a lump sum. The mill man, experienced in estimating, goes through the woods and sizes up the quantity and value of the timber he wants. The owner, being a farmer and not a lumberman, seldom knows anything about estimating timber and has only the vaguest idea of what it ought to bring. The consequence of this condition is that the farmer often receives only a small fraction of the actual market value of his stumpage.

Astonishing examples of what a farmer may thus throw away are often encountered by foresters, continues the article. For instance, a Massachusetts farmer sold a million feet of timber to a portable sawmill man for $1,200, and thought he had obtained a good price. His neighbor, however, who knew something about timber, got $7,000 for the same quantity of white pine from the very same portable mill man. The first farmer, on account of his ignorance, practically presented the mill man with $5,800; the second owner was wise enough to learn before he attempted to sell his timber how much he had and what it ought to bring him in money.

The productive capacity of the 200 million acres of farm lands throughout the country which either have or should have timber growing on them is enormous, says the article. This area is larger than all the national forests put together, and with an annual growth of 200 board feet per acre of saw timber—a moderate allowance under the practice of forestry—it would produce annually forever about 40 billion feet, or the equivalent of the entire lumber cut of the country, in addition to not less than 120 million cords of firewood.

These figures, continues the article, probably never will be realized, for the reason that the present area of farm woodlands is much greater than it will be eventually. For example, woodland comprises 31 per cent of the entire farm area of the South, and undoubtedly much of this land will be put to other uses than timber growing. Nevertheless, the farmers of the United States now own at least 250 billion feet of saw timber and 1 1/3 billion cords of cordwood, and this timber should produce a substantial part of their incomes. Farmers ought to make the most of their timber, and the public should be interested in this question for the reason that the vast aggregate of farm timber should be available to supplement the other sources of the general supply.

The Lumber Industry Inquiry

LUMBERMEN have great hope that the inquiry by the the Federal Trade Commission into existing conditions of the lumber industry may result in some form of relief which will overcome the prevailing business depression in the lumber trade and aid it to return to a profitable basis. To this end the lumbermen of the middle west, south, north and the Pacific slope openly placed before the members of the Commission at Chicago and elsewhere all the facts they had and suggested various methods for relief, the chief of which were the curtailment and regulation of production with the sanction of the Government and the increase in consumption encouraged by laws favorable to such an increase.

How important the hearings are to the lumberman is evident when so influential a journal as the *St. Louis Lumberman* says:

> "In our opinion, the Chicago proceeding was epoch-making for the lumber industry. It was something out of the ordinary in externals and 'features.' One realized that it was the first of a series of sessions to be held in the West; that the lumbermen were honored by the precedence given them over other Western interests for the presentation of their case; that the chosen and elect of the lumber manufacturing business were brought together before the Commission from all over the country, and that, generally speaking, this newly created federal body was 'starting something.' . . . The two days spent by the Commission in hearing the lumbermen marked the beginning of new and better history for the lumber interests, because of the very plain meaning of the creation and the clothing with legal powers of such a body as the Commission."

As to the much-discussed question of the legal power of the Commission, the same paper says:

> "Manifestly, that body must stand in relation to business in the future as the Interstate Commerce Commission has stood in relation to the railroads of the country. Both the legislation and the machinery connected with this new federal agency necessarily have a purpose in the abridgment of the barbarities of anti-trust statutes and a turning toward a more enlightened policy of law-administration touching corporations and associations."

The *New York Lumber Trade Journal* harbors some doubt as to whether the Commission has the power to accord the relief requested by the lumbermen but sees benefit in the hearings notwithstanding. It says:

> "Some are skeptical as to the Federal Trade Commission being able to realize to any degree the hope which its sponsors had in their minds when the law creating it was enacted. This, time alone can tell. Nevertheless, the special data, as well as the testimony given by distinguished lumbermen at the hearing, men who have devoted a lifetime to the industry and who know its every ill and need, was replete with facts which it is well for the Government to know and consider, and particularly so by reason of the previous governmental antagonism to the industry. This hearing and testimony rendered should result in some good irrespective of whether the Federal Trade Commission is able to accord any material relief."

With a distinct legal trend of mind is the editorial expression of the *Lumber Trade Journal,* of New Orleans, relative to the powers of the Commission. It emphasizes the fact that these powers are vague and indefinite.

> "No one is in position to say that the Commission has power to grant affirmative relief, so that the agreements sought can be put into effect," it says. "An able brief was presented which argues that the Commission has such power. The act, however, is indefinite. If the Commission has the power to say that certain acts are legal, is it not placed on a parity in power with the United States Supreme Court? Action is begun by the Government in the courts to test the validity of the order of the Commission, the case reaches the Supreme Court, which decides that the Commission has made a mistake, that it has no power to decide that the acts it authorized were not violations of the anti-trust laws, while in fact they were. Isn't the Supreme Court the highest authority? There is no appeal from its decisions. Then what authority has the Federal Trade Commission? It is stated that the Commission naturally will not make any orders without consulting the Department of Justice, so that its orders will really have the sanction of the Government, and that no legal action will follow. There are others who maintain the Commission can only investigate, draw conclusions, suggest remedies for the action by Congress into laws. If Congress will act on such recommendations, granting the relief requested, the money that is spent by the Commission will have been well spent, but if the Commission cannot do anything that will benefit the business of the country, all will be wasted."

Some hope of relief is voiced by the *Mississippi Valley Lumberman* in saying:

> "If the Federal Trade Commission takes the only logical action which can follow from this exposition of the situation in the lumber manufacturing industry, the hearing will result in the greatest good that has come to the lumbermen of the country in the history of lumbering. The situation will soon become intolerable unless some step is taken to relieve it, and we believe that recommendations to Congress on the part of the Commission will be heeded and the needed relief granted. In connection with the study of the industry recently undertaken by the Departments of Commerce and of Agriculture, the need of the lumber trade for legislation of a constructive character will be plainly set forth."

Of the conservation feature of the existing situation this same publication says:

> "Emphasis was laid on the fact that existing conditions are the foe of conservation, since manufacturers are absolutely unable to manufacture a considerable portion of the tree at a profit, and it must be left in the woods to rot. It was pointed out that the southern pine manufacturers are able to utilize only 70 per cent of the timber on any given tract, with the result that the remaining 30 per cent is absolutely wasted."

Even more optimistic in tone is the comment of the wide-awake *Southern Lumberman*, for it says:

> "That the lumber industry is standing on the threshold of a new era of governmental aid and cooperation seems a safe prediction as a result of the hearing afforded the lumbermen by the Federal Trade Commission in Chicago. This belief has a firm foundation in the friendly spirit of cooperation exhibited by the Commisson in its conduct of the hearing, and its manifest desire to be of real help to the industry.
>
> "It is a source of extreme gratification and relief to note such an attitude on the part of a governmental commission. It is a relief to feel that in the future the industry may proceed without the constant fear of being heckled and investigated by inquisitorial bodies as has been so unfortunately the case in recent years. That the lumbermen were confident of being met in the friendly manner in which they were received was apparent from the frank and open nature of their statements and their determination, as expressed by one of them, to 'lay their cards on the table, face up.'"

How helpful the Forest Service may be to the lumbermen, and how much they need its help the *Hardwood Record*, of Chicago, tells in stating that the lumbermen at the Chicago hearing lacked, in many instances, positive information, this being particularly noticeable when they were called upon to reply to some leading questions.

> "At first thought," says the *Hardwood Record*, "the compilation of this information appears to be too gigantic and complicated a task to seem practical, but it is within the lumbermen's power to have the task performed without any effort or expenditure on their part if they will but embrace an opportunity that is now offered which can be broadened if they will but make it known that they wish it to be. We refer to the present investigation of lumber and lumber markets as being carried on by the Federal Forest Service. This investigation as originally planned was to have covered the entire lumber industry in all of its departments from the stump to the finished article made from wood and to embrace all woods. Due, however, to the fact that no one is particularly or directly interested in seeing that each wood is given its fair share of attention, and inasmuch as it seems to be expedient to cut down the scope of the investigation on account of insufficient appropriation, the Forest Service officials in charge of the work eliminated the investigation of many of the important woods and are now dealing only with a limited territory and in a rather limited way. The point is that if the lumbermen would make it known to the Forest Service that they urgently desire that the investigation be made comprehensive of all industries affiliated with the lumber industry, and all industries directly dependent upon the lumber industry, the Service would be able to secure without undue trouble sufficient funds from other sources to make this study one of real importance while it is being done, rather than of merely casual importance in a general way and of no direct importance as far as its being representative of the entire industry is concerned."

Original ideas are to be expected in the *Lumber World Review*, of Chicago, and here is what appears anent the hearing:

> "It would only be a begging of the question for either the Federal Trade Commission or the lumbermen to now bring up in *real earnest* the *plea* that neither party to the arrangement had understood the purpose or the cause which brought this event to pass.
>
> "It has come directly to us—first by careful attention to all the proceedings and by another source of information of a perfectly legitimate character—of which all well-regulated newspapers avail themselves—that the Commission's purpose was to discuss the conditions which surround *only* the *foreign* lumber trade of the United States.
>
> "*Whether* or *not* the lumber manufacturer understood just what the Commission wanted, it is very sure now that when the Commission sorts out the information that it secured, classifies and weighs it all, it will find itself in possession of *facts* that it could have little dreamed might exist concerning *any* great industry in this 'land of the free and home of the brave.'"

Warning the lumbermen not to depend too much on the ability of the Federal Trade Commission to alleviate the present situation, the *American Lumberman*, of Chicago, says:

> "Its powers, of course, are not so fully defined as they will be later. But they do not—nor will they later—include the right to negative or render ineffective any statute now in existence relating to combinations 'in restraint of trade;' neither can the Commission run counter to decisions of the federal courts construing those statutes. Consequently to see how the Commission can render first-aid to the lumber industry at this time is rather difficult, particularly as most manufacturers are of the opinion that curtailment of production is the only remedy in sight. Certainly the laws of the United States as they stand today have not yet been construed as permitting any sort of agreement or understanding among producers that will result in curtailment, nor would it seem to be in the power of the Trade Commission to sanction such agreement or understanding."

When the Commission will make a report it is impossible to say. A mass of evidence has been collected and it will take some time to digest it, but the lumbermen are hoping that the report will be ready for presentation to Congress early in the coming session.

Editorial

THE NEW YORK CONSTITUTION

AS WE go to press, the conservation clauses of the new Constitution of the State of New York have reached what promises to be their final form. Efforts to materially change the old clause prohibiting constructive uses of the State forest lands have failed, and the State is undoubtedly committed for the next twenty years to the policy of preserving her immense area of 1,600,000 acres "forever as wild lands." Minor changes were adopted, one legalizing the occupancy of State lands by a few squatters who have continuously occupied the lands since before the State obtained title; one permitting the construction of a single highway of sixty miles to connect the Old Forge with the Fulton Chain of Lakes; and one which permits the Conservation Commission to remove at State expense, but not to sell, dead and down timber. Not only is the cutting and sale of all classes of timber prohibited, but, with the above exception, no roads or trails can be built which involve the destruction of green trees—and this means that no highways can be built. The leasing of lands for camp sites and other occupancy is prohibited.

This means that New York is to maintain, protect, replant and pay town taxes upon an area of land more than half the size of the State of Connecticut for the purpose of preserving a wildnerness whose sole use is as a possible recreation ground for the people of the State. But will the people, whose property it is and who maintain it, derive the full benefit from this enormous project? State parks *should* exist for the benefit, not of the largest taxpayers, but of those to whom other avenues of recreation are cut off. Theoretically, the State lands are open to all. Practically, they are largely inaccessible and useless, save to a few hardy spirits, young men who can rough it on foot or by canoe; or as an adjunct to large private holdings and maintained at State expense for the incidental benefit of those who have residences and equipment in the vicinity. To be of service to the public, to restore health to invalids, to provide easy access for families with young children, in short, to serve as the lungs of the State where those who need it may find health; is this the real purpose of those who fought for these amendments? Let other States beware of the example set by New York, and provide, as does Pennsylvania on her million acres of State forests, that roads and trails shall be constructed to all parts of her domain, that campers be encouraged by a system of permits and that the State lands become actually and not merely in name, a real park which the people can use to the fullest extent.

Except in its remotest parts, this country has outgrown the wildnerness stage of its development. Yet sentiment strikes deep and we preserve vast areas where the trees shall be allowed to rot and fall so that the chickadee may not lack a hole in which to build his nest. Why is it that we cannot learn the lesson of the greatest good to the greatest number? A comparatively small acreage, *well located,* and made accessible to the public, will, if preserved in its natural condition, be of far greater value to immensely larger numbers than the entire Adirondack wilderness "kept forever as wild lands." Wealthy land owners can then fence in their estates if they desire and big-game hunters and other worshippers of solitude may still find what they seek, well within the reach of their purse. It would be instructive for the framers of New York's Constitution to visit the Pennsylvania State Tuberculosis Sanitarium, located on the Caledonia State Forest near Chambersburg, made accessible by a well-constructed road and supported entirely by State funds for the benefit of its unfortunate invalids.

From the first, this reactionary policy of reducing the State lands of New York to their lowest minimum of usefulness to the public has been strengthened and made possible by the fear of vandalism and the impression that lumbering is a synonym of forest destruction, breeds forest fires and corrupts State officials. We admit that unrestricted lumbering conducted for the sole purpose of removing the entire merchantable stand, does just this, and that where there is anything to be obtained by it, efforts would be made in the future as in the past to obtain privileges dishonestly. In the light of the unfortunate forestry experiment at Axton, where a policy of clear cutting to remove old defective hardwoods was pursued in order to plant conifers, the New York public became deeply distrustful of "scentific" forestry, for to them a slash was a slash, and clear cutting with replanting too closely resembled clear cutting with no planting at all, especially when no disposal of the slash was made. It is not a matter of surprise that after nearly twenty years this incident should be cited as one of the strongest arguments against permitting the cutting of timber on the State reserves. Foresters who urged the adoption of the timber cutting clause were simply regarded as allies of the lumber interests seeking to benefit themselves as well as the lumbermen at the expense of the State.

What is the truth of the matter? Every acre of State land should be put to its most beneficial use, for the good of the greatest number of persons. It is not a crime to sell State or National timber, provided its sale *does not interfere with the use of the forest for recreation.* This is true no matter if circumstances dictate the clear cutting of portions of the forest. That 90 per cent of most large tracts may be lumbered without such interference

by a judicious preservation of lake shores, trails and road belts has been proved time and again, and the only persons who would be materially benefited by the sacrifice to the "wilderness" of the entire area are those to whom the mere idea of having prevented the "spoliation" of State lands is a moral satisfaction. It does not diminish the game nor decrease the streamflow, since the "brush" cover is as favorable to both as the high forest. Under regulated lumbering, slash is disposed of, fires are kept out and reproduction is secured. No other kind of lumbering is contemplated under State or National management. Nor are lumbering and clear cutting necessarily synonymous. To note the difference between logging on private lands without regulation, and cutting under proper public supervision, one has only to inspect the thousands of acres cut over on the national forests in the yellow pine belt of the West, where it takes close observation to discover that there has been any cutting, even after the removal of two-thirds of the merchantable stand.

We insist that an incorruptible and efficient State forest administration is a possibility in New York under the new Constitution, just as it is an accomplished and indisputable fact in the National Forest Service. Such an administration can be trusted with the proper management of State timber, including the cutting and marketing of mature trees for the utilization and improvement of the forest. We hope that America will eventually show herself as intelligent as continental countries and able to solve the comparatively simple problem of proper utilization of State forest and waste forest land for the best good of all. But this result will never be obtained, in New York or elsewhere, while any one selfish interest demands the sacrifice of public rights and equity to the fulfillment of a sentimental dream. The American Forestry Association stands squarely on the platform of State and National forests developed to the greatest degree of usefulness to the State and its people, partly by strict forest preservation, partly by utilization of mature timber. It equally opposes those who would disrupt and destroy such forests and those who would condemn them to remain perpetually as wild lands for the preservation of a remembrance of a prehistoric epoch.

FOREST SERVICE METHODS APPROVED

IT IS gratifying to see that lumber trade papers believe timberland owners may learn something to their advantage by studying the methods by which the Forest Service so capably administers the national forests. The *Southern Lumberman,* in an editorial on August 7, suggests that the adoption of Forest Service methods would put money in the pockets of private owners of timberlands. The editorial says:

"Though the conduct of the national forests by the Government can in no sense be compared with private enterprise as a business venture, the revenues derived from the forests by the Government and turned into the Treasury by the Department of Agriculture through its subsidiary branch, the Forest Service, are by no means without interest. Though the Government pays no taxes and borrows money at half or less than half of the rate of interest which private enterprise has to pay, some of the sources of revenue from the forests as shown in the report of the service might prove valuable suggestions to other holders of large tracts of timber awaiting development. It will be noted that grazing and special privileges form a good portion of the sources of revenue from forests. What the Government finds a market for in this way, other timber holders might also find worth exploiting either of their own initiative or by rental, as is the case with the Government. There are certain of these and perhaps other sources of revenue which could be realized as a valuable means of lessening carrying charges on large tracts of timber held either in reserve by manufacturers or for speculation by investors."

SEND THE MAGAZINE TO YOUR FRIENDS

EACH member of the American Forestry Association is urged to send to the Secretary the name of one or more friends who might be interested in the AMERICAN FORESTRY magazine. Upon receipt of the name and address, a copy of the enlarged and improved magazine will be mailed, without charge, for examination. It is the ambition of the Association's officers to make the magazine so valuable that the desire for it will produce a large and steady increase in membership. It must be seen and read before its value is appreciated, and the members can best assist in having it seen by sending names and addresses of friends, to whom free copies will be mailed. The stronger our membership, the more effective our work for forest conservation.

Trees As Sign Posts

Varieties of trees, instead of unsightly signs, are to give warning of approach to railroad crossings, bridges and dangerous turns on the Lincoln Highway, according to an announcement by Elmer C. Jansen, chairman of the American Institute of Architect's general committee on the highway. Mr. Jansen, who recently finished a trip over the Illinois section of the highway, said the tree feature was part of comprehensive plans for the restoration and preservation of nature's beauties along the transcontinental road.

Cutting Walnut Trees

A newspaper dispatch from Leavenworth, Kans., says: "There will be no walnut trees left in this part of Kansas and across the river, in Missouri, if the European war keeps up much longer. At present three bands of men are cutting walnut trees down and sawing the lumber into 12-foot lengths, shipping them to the East by fast freight.

The walnut lumber is wanted for gunstocks for rifles for the European armies. All trees more than 6 inches in diameter are purchased, and a good price is paid for the lumber. Those selling the trees have not been informed what country the wood is destined for.

H. S. Sackett in Charge

Early in August the United States Forest Service opened an office in the Federal Building in Chicago, Mr. H. S. Sackett being placed in charge. Mr. Sackett is engaged in making inquiries for the Forest Service into the cost of manufacturing lumber and procuring reliable data on lumber cost, a work which the lumbermen are doing what they can to assist and encourage.

Wood Pulp for Explosives

A recent newspaper cablegram from London says that the Germans will soon be using wood pulp as a substitute for cotton in making explosives, following a discovery made by a German chemist. The wood is ground, cooked and changed into a liquid. Then it is cleaned, pressed into sheets and by the addition of certain chemicals becomes a desirable substitute for cotton as a basis for various explosives.

Forester Will Raise Fruit

"E. M. Griffith, former State Forester of Wisconsin, will go South, purchase a tract of fertile land in the sunny clime, and raise fruit where the wicked cease from troubling and the weary are at rest. If Mr. Griffith does as well in the fruit business as he has done with forestry, he will be a valuable acquisition to the State that receives him as a citizen," says the *Hardwood Record*, of Chicago.

Favorable Fire Season

Reports recently received by the Western Forestry & Conservation Association, from all protective agencies in the Northwest, show practically no loss of timber through forest fires up to the middle of August.

Favorable weather conditions and careful preparations for the season are the chief factors which have so far made for a clean record on the part of patrol organizations. Following the plan of previous seasons each protective agency began, well in advance of dry weather, to get its territory in the best possible shape for successfully combating any fires which might become started. Additional lookout points were equipped, telephone lines extended and repaired, new trails constructed, and every effort made to secure the best possible cooperation between the various patrol organizations. These efforts are now bearing fruit in the prompt detection and suppression of all fires which become started.

Although the beginning of August saw conditions much more favorable than those of a year ago, there is still time for the woods to become dry and only the greatest care and vigilance will prevent fires from starting during the next few weeks.

Gift to a College

The State College of Forestry at Syracuse has just received a very valuable gift of over 120 mounted game and water birds, and 21 mammals from Congressman Peter G. Garry and his brother, Robert L. Garry, both of Providence, R. I. This collection was secured for the college through the interest and help of Dr. William T. Hornaday, director of the Zoological Garden in Bronx Park. Dr. Charles C. Adams, Forest Zoologist of the College, had presented to Dr. Hornaday earlier the urgent need of the College for mounted birds and mammals. Soon after this Mr. Robert L. Garry wrote Dr. Hornaday about the disposal of the Garry game collection, as it will be called by the College, and Dr. Hornaday recommended that the collection be turned over to the State College of Forestry at Syracuse.

Idaho's Good Record

Idaho experienced a few small forest fires in July and early August, none of which have caused loss of timber. Only the normal force of patrolmen is on duty, but every precaution is being taken to see that fires are promptly discovered. The Forest Service has this season constructed several emergency warehouses where fire-fighting tools, available for immediate shipment to points needed, are stored. This is in addition to the tool supply which each National Forest maintains.

To Save Shade Trees

John J. McInerney, counsel for the New York Motor Federation, will try to secure the passing of a measure at the next Legislature protecting the shade trees along State highways. Many of the fine old trees alonge the State roads are dying for need of a little skillful care, Mr. McInerney says, and this care should be given by the State as it is in other parts of the country.

Studying Forest Animals

Alvin G. Whitney went to the New York State College of Forestry during the summer as an advanced student to take up ecological studies of forest animals with Dr. C. C. Adams, Forest Zoologist. Mr. Whitney is a graduate of Dartmouth College and has taken advanced work in forestry at Yale University and went to the New York State College of Forestry after some time in the employment of the United States National Museum and the Biological Survey of the United States Department of Agriculture. During the coming year he will investigate several problems in the relation of birds and mammals to woodlands.

Slight Fires in Oregon.

Oregon experienced no forest fires worthy of mention during July. A few fires escaped as a result of slash burning but were speedily extinguished without loss of green timber. About 300 wardens are on duty outside of the National Forests and this number will probably be slightly increased if rains are not forthcoming within the next few days. The need for strict enforcement of the forest laws has been especially emphasized this season, and a campaign to eliminate the smoke nuisance has been vigorously carried on.

Lookout Stations

An inspection of the forests in the Pine Mountain and Cumberland sections of Virginia and Kentucky was recently made by State Forester R. C. Jones, of Virginia, and State Forester J. E. Barton, of Kentucky, to select sites for building lookout stations through the mountains as a protective measure to reduce the number of forest fires throughout eastern Kentucky and southwestern Virginia. The Eastern Kentucky and Southwestern Virginia Forest Protective Association recently organized in Jenkins, Ky., has also made plans to build "lookout" stations through the mountains of Elkhorn, Boone's Fork, Beaver Creek, Long Fork and Shelby. The Consolidation Coal Co., one of the largest timberland owners in this section, has subscribed 100,000 acres to the association, while other interests have subscribed considerable areas. The Leslie-Perry County Forest Association met at Hyden, Ky., August 5 and discussed plans looking to

the care and preservation of the forests of the two counties now included in the association.

Russia's Forests

Russia now occupies first place among the nations of the world in the extent of its timber resources, the value and quality of two-thirds of which are practically unknown. The total area of the empire is about one-seventh of the land surface of the globe, and 39 per cent of it is under forests. Those in European Russia cover an area of 474,000,000 acres; in Finland, 50,500,000 acres; in Poland, 6,700,000 acres; and in the Caucasus, 18,600,000 acres; a total of 549,800,000 acres, exclusive of Siberia. In the Ural Provinces, forests cover 70 per cent of the area, in the northern Provinces 68 per cent, and in the four lake Provinces 57 per cent. It is estimated that in western Siberia alone there are 465,000,000 acres of virgin forests, and eastern Siberia, while not so richly endowed, has sufficient timber to supply the world's demand for years to come.

The Government owns 285,598,941 acres of forest land in European Russia, 12,826,387 acres in the Caucasus, 360,519,435 acres in Asiatic Russia, and 288,742,000 acres in the Amur region, a total of 947,686,763 acres. Twenty-three per cent of the forest land belonged to landed proprietors and 9 per cent to the peasantry in 1910.

The principal timber lands of eastern Siberia are in the valleys of the Amur River system, which cover an area of about 2,000,000 square miles. Of this area, only about 400,000 miles is considered available for timbering, but according to local calculations, allowing 45 merchantable trees to the acre, this would give some 11,520,000,000 trees. As the time required for these trees to mature is placed at 100 years, 115,200,000 trees could be cut per annum without diminishing the forests, with proper reforestation methods.

The Russian Forestry Department places the total timber land in Siberia at 810,000,000 acres, of which two-thirds can be successfully placed on the market.

Forest Fire Insurance

What is believed to be the first forest fire insurance policy ever issued in the United States, and so far as can be learned, the only one of its kind in existence, protects the forest plantation of Arthur H. Hacker in Pike County, Pa., says *The Hardwood Record*. Mr. Hacker's woodland was principally chestnut, but the blight forced him to cut the timber. In the spring of 1914 the cut-over area was planted with white pine seedlings and transplants, a total of 35,000 being used for the purpose. The chestnut timber was of rather small size but the proceeds paid nearly all the cost of restocking the area.

In order to protect himself against loss by fire the owner commissioned his broker to insure the tract. After considerable difficulty this was finally done and on May 9, 1914, an Eastern insurance company issued a policy. The form used is the standard fire insurance policy of the States of New York, New Jersey, Pennsylvania, Connecticut and Rhode Island, but the following clause is inserted: "On young pine trees to cover pro rata on each tree; situate on side of Raymond's Kill Creek on which residence is located, on premises known as 'Woodside,' about one mile westerly from Shanno's, Dingman's Township, Pike County, Pennsylvania." The amount is $750 and the premium rate is 10 per cent, a prohibitive figure for ordinary plantations. This company has no intention of entering the forest fire insurance business and does not care to assume such risks as a general proposition.

Forest fire insurance is fairly common abroad and eventually will become so in this country. Accordingly the policy just described has especial interest as being the very first attempt, so far as known, in the United States.

Forest Management Plan

Six graduate students in the Department of Forestry, Cornell University, have recently completed a detailed working plan for a 3500-acre tract in the Catskill Mountains. This tract lies at the headwaters of the well-known Esopus River, the main feeder of New York City's mammoth Ashokan Reservoir, and hence is of great value as a protection to this and other streams arising in the vicinity. The tract is divided into steep upper slopes and more gentle lower slopes, about half of the 3500 acres being in each of the two slope types.

The work was done in connection with the training given to its students by the Cornell Forest School as a part of the course in the management of large forest tracts.

The Cornell forestry authorities state that logging operations should be conducted under an orderly and well-planned system which will insure the improvement of the forest by use, and at the same time will not impair its value as a protection to stream-flow. Timber cutting under such a plan, the Cornell foresters say, will yield a revenue and safeguard the public interest.

Estimating Maine's Forests

O. W. Madden, of the James W. Sewall office, Old Town, Maine, is engaged in making a thorough timber estimate of about 100,000 acres in the northern part of Maine for the state. This work is being carried out under the directions of the Board of States Assessors for purposes of valuation, and it is expected that the data gained thereby will greatly assist in equalizing taxes. Mr. Madden expects to be in the field until November.

Fires Cause Small Loss

Washington reports some thirty-five forest fires during July, all promptly extinguished, and with small loss of timber. The Washington Forest Fire Association has eighty-seven men on duty, and the state, through its own and the Federal Weeks Law appropriation, nearly as many more.

Montana Escapes Fires

Montana reports a most favorable forest fire season as compared with last year. The Northern Montana Forestry Association has had no fires in its territory and as all precautions have been taken to discover and extinguish fires quickly the season may pass with little or no damage.

Courses in City Forestry

The raising and care of forest trees for streets, home grounds and parks while not the principal work of the forester is nevertheless closely connected with the proper development of forestry. With a growing interest in city planting and the beautification of home grounds and country properties, there is an increasing demand for men trained thoroughly for the carrying out of city street and park work and other phases of aboriculture. This demand the New York State College of Forestry is filling by offering professional courses in Arboriculture or City Forestry which will train men thoroughly and effectively for every phase of work connected with the planting, care and protection of shade trees, whether upon private grounds, in streets or parks. A number of men are already taking up this course.

New York City Trees

As a result of the special fund given to the Department of Parks of the City of New York, by John D. Rockerfeller, Jr., Prof. Laurie D. Cox, Landscape Engineer of the State College of Forestry at Syracuse, is working during the present summer with the Hon. Cabot Ward, Commissioner of Parks of New York City. Professor Cox is making a study of the forest trees of New York City, the various methods used in the planting and protection of trees and of the organization of tree planting work. Professor Cox is a graduate in Landscape Architecture of Harvard University and went to the State College of Forestry at Syracuse last year after four years as Landscape Engineer for the City of Los Angeles. The results of the studies carried on by Professor Cox during the summer will be presented in a formal report to the New York City Department of Parks.

The Canadian Department

By Ellwood Wilson

Secretary, Canadian Society Forest Engineers

The two most important questions in Canada from the standpoint of conservation are still those of settler's fires and fake settlers. Fire protection has made enormous strides in the past three years, but its further progress is almost barred by these two difficulties.

In order to make the subject intelligible a few words of explanation are necessary. All of the lands in the Provinces were in the hands of the Provincial Governments and these are practically only disposed of in one way and that is to settlers, one hundred acres to each settler, who is required by law to clear a certain proportion of his lot each year, erect certain buildings and to make cash payments at the rate of thirty cents per acre. At the end of three years, if all conditions are fulfilled, he receives a patent or the freehold of his lot.

All timberlands which are still unsettled and remain in the hands of the Government are "licensed" or leased to lumbermen at a ground rent of so much a year and a certain price per thousand feet board measure on all timber cut. A diameter limit is imposed below which no timber can be cut. The original reason for this diameter limit was so that the lumberman could not cut off all the timber, which would spoil the land for settlement, as there would be no timber for houses and fences. If settlers were confined to certain districts apart from the licensed lands, there would be no fire risk, but lots are sold every year from lands already under license and the clearing operations are a great menace. There are good laws to regulate such clearing but they have never, until six years ago, been enforced, and few of the people even know of their existence. Then, too, judges are very reluctant to impose fines and the Government in trying to punish the settlers is hampered by members of Parliament, who do not like to see their constituents fined.

The only thing possible is an educational campaign which should really be carried on by the Government by means of circulars, lectures with lantern slides, circulars and talks in the schools. These means are all employed in improving the condition of the farmers and should be used in educating them in the proper care of the forests.

The question of fake settlers, while not so grave, is still dangerous. This abuse has been largely overcome but needs to be exterminated. Men take up farms pretending to be bona fide settlers, cut off the timber and then leave the lots. This is often engineered by sawmill men, who provide the money and buy the cut. The débris from this heavy cutting is a grave fire menace.

The Deputy Minister of Lands and Forests of Ontario, Mr. Aubrey White, C.M.G., died suddenly at Muskoka on July 14. Mr. White was one of the early active members of the Canadian Forestry Association and tried to work out the best plans for forest conservation. He was President of the Association in 1904–5 and presided at the Quebec meeting. He was for two years Honorary President and after that a Director. Mr. White held very strong views as to what was the best way to promote forestry progress and was probably prevented by his chiefs and political needs from carrying out his views, but it is to be hoped that the handling of Ontario's timberlands will now be brought up to date. Personally Mr. White was a charming man and he will be much missed by his friends.

Mr. Clyde Leavitt, Forester to the Dominion Railway Commission, the Conservation Commission and President of the Canadian Society of Forest Engineers, spent three days recently inspecting the work of the Laurentide Co., Ltd., at Grand' Mere, going over the plantations, nursery and experimental cuttings, looking over roads and fire lines. Plans for the work of the Canadian Society of Forest Engineers were also discussed with the Secretary, Mr. Ellwood Wilson. Mr. Leavitt also attended a meeting of the St. Maurice Forest Protective Association which discussed the advisability of proceeding against some flagrant violators of the Forest Fire Laws. It was decided to take action against three of these, making test cases and the Association's lawyer was instructed to proceed. A report of all the fires to date this season was made by the manager and discussed. The total number was twenty-five, divided as follows: Settlers, 13; employes of companies who are Association members, 7; unknown, 4, and hunter, 1. Three fires were started by men who wanted work. The most serious situation disclosed by this report was the lack of active cooperation by employes of companies who belong to the Association. This is due to lack of interest on the part of heads of Woodlands Departments, which attitude is seen by their subordinates and reflected in their conduct. Among the fires set by settlers several were set in one section where fake settlers are operating. They sell their timber to a sawmill owner, who is powerful politically.

The publicity campaign being carried on by Mr. Robson Black, Secretary of the Canadian Forestry Association, shows what can be done along these lines and is really the most important part of the work of the Association. Education is at the bottom of all progress and those who have endeavored to help along the cause of conservation are compelled more and more to realize this. The material furnished to the papers and magazines and the number of these using it show the value of this work.

The July number of the *Canadian Forestry Journal* is an excellent and most readable one.

Mr. Henri Roy, of the Quebec Forest Service, has been elected an active member of the Canadian Society of Forest Engineers, and Mr. E. S. Holloway, Engineer of the Canada and Gulf Terminal Railway, an associate member.

Mr. S. L. de Carteret, Forester for the Brown Corporation, has made some very interesting growth studies on trees growing in latitude 48 degrees north. His results show that the average volume per cent of mean annual growth is for white spruce, 0.69; for black spruce, 0.64; for balsam fir, 1.36, and for jack pine, 0.99. The periodic annual growth of last inch is on the average for white spruce 1.50 per cent, for black spruce 1.48 per cent, for balsam fir 3.08 per cent, and for jack pine 1.59 per cent.

The Dominion Forest Service has under consideration the commencement of experimental forest work and the probable establishment of one or more experimental stations all under the charge of one head. This will be a long step in advance and will supply a great deal of information which is badly needed in practical work Growth of trees and stands can be studied, the best mixtures to plant, the relative values of natural and artificial regeneration, the effects of light on different species, the costs of various logging methods and their effects on stands can all be studied to advantage.

Mr. F. J. Campbell, the progressive manager of the Canada Paper Company of Windsor Mills, Que., has just had an expert looking over the timberlands of that company, to advise him as to best methods of handling these lands so as to put them in the best possible condition for future production. This company will probably institute a good method of slash disposal and start a nursery for their planting needs. They have excellent limits which will well repay careful treatment, as they are all within twenty miles of their mill, easy stream to drive, and the process used in making pulp allows them to utilize all sizes and species of wood.

The Department of Lands and Forests of Quebec, in cooperation with the Laurentide Company, Ltd., have set aside a tract of about four square miles of practically virgin timber to be used as an experimental tract. The Chief Forester, Mr. Piché, and the Company's Forester will decide on methods of cutting and brush disposal and these will be carried out under careful supervision, and the costs of different methods and their effects on the stands and on regeneration will be carefully studied. Much valuable information should be obtained.

An order-in-Council will soon be passed by the Quebec Government making it obligatory on all timber operators to clean up their lands to a depth of 100 feet from the edge of the right-of-way of any railroad passing through their land.

The Laurentide Co., Ltd., will finish its season's planting operations by planting 90,000 Norway Spruce, three-year-old seedlings. Plantations previously made have made exceptionally good growth this season.

British Columbia Notes.

Another result of the efforts made by the Provincial Government on behalf of the lumber industry is announced by the Minister of Lands, the Admiralty having agreed to turn over to the British Columbia Government, for one voyage from this Coast to the United Kingdom, the steamer "Grahamland" now at the Falkland Islands. The "Grahamland" has an interesting history, having been, until the destruction of Admiral von Spee's squadron, the German collier "Josephena," when she surrendered to one of the British warships. The ship was offered through the Agent-General, to the British Columbia Government for the transport of a lumber cargo to the United Kingdom, not necessarily for amiralty purposes, and this being so, all timber shippers were notified and asked to make offers for the vessel, the amount of the charter being £6,600. The bid of the Cameron Lumber Company, of Victoria, was accepted, and the "Grahamland" is expected to arrive for August loading. Her capacity is given as 550 standards equal to 1,100,000 feet, and the securing of such a vessel at a time when tonnage is scarce by a British Columbia firm even at such a high figure is a matter for congratulation.

The last weekly telegraphic reports received by the Minister of Lands concerning the forest fire hazard were very encouraging, every district reporting several days of rain accompanied by cool weather. A few fires occurred in slash, but were extinguished without trouble and expense, the fire stopping in every instance as soon as green timber was reached.

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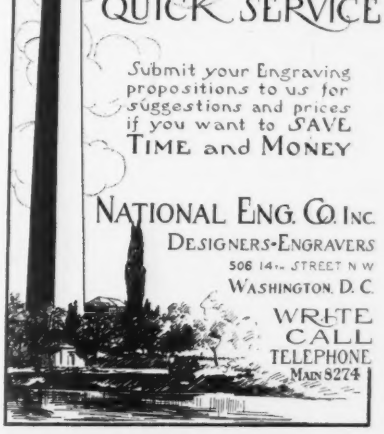

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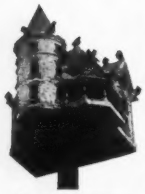

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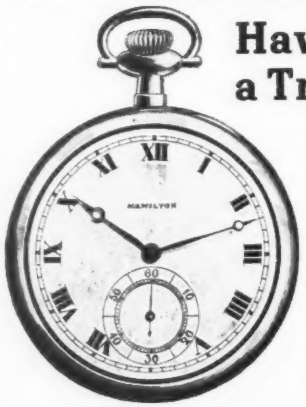

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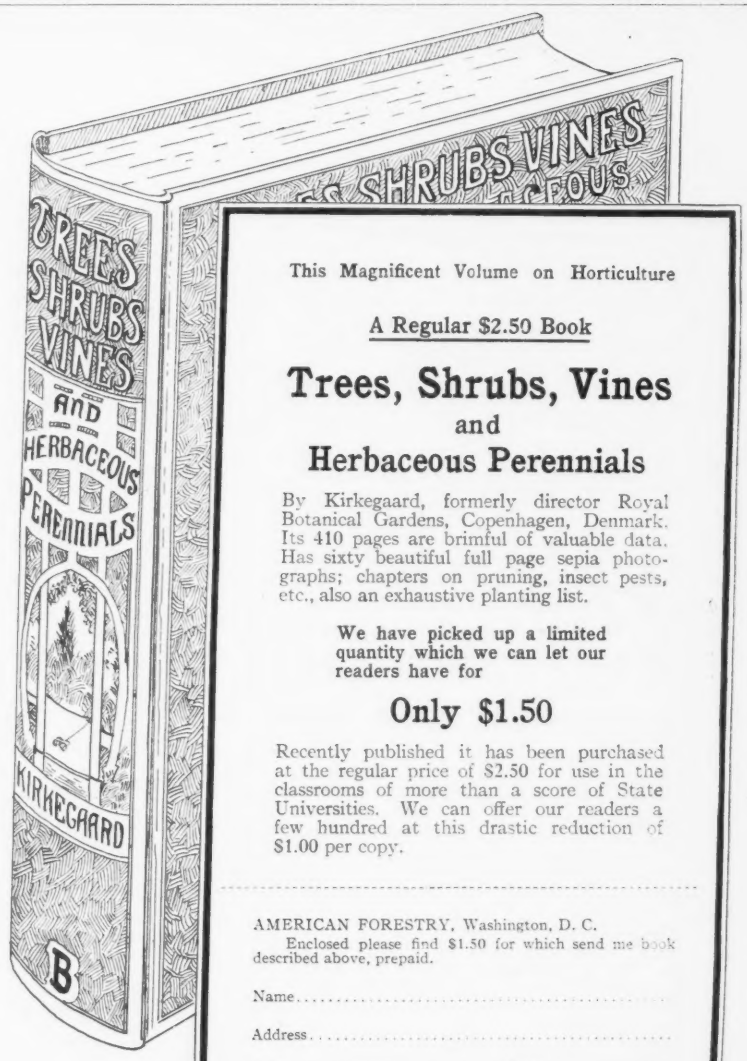

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